

THE SCIENTIFIC AND LITERARY REVIEW,

AND RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

Journal of the Inventors' Institute.

REGISTERED FOR
TRANSMISSION ABROAD.]

[ALL RIGHTS
RESERVED.]

VOL. IX.—No. 8.]

AUGUST 1. 1874.

[PRICE 6d.

[NEW SERIES.]

*** Communications to the Editor to be addressed to him at 21, Cockspur Street.

CONTENTS.

	PAGE.		PAGE.		PAGE.
ADVERTISEMENTS	109	CORRESPONDENCE—		Geographical Society	116
APPLICATIONS FOR LETTERS PATENT	109	Government Indifference and Inventors' Rights	114	Asiatic Society	116
EDUCATIONAL ENDOWMENTS.....	111	ANCIENT ROME	114	Geological Society	116
REVIEWS—		OBSERVATIONS ON AN ECLIPSE	114	Chemical Society.....	116
English Salmon Fisheries.....	112	AN ANCIENT CHINESE CAPITAL.....	114	Meteorological Society	116
Accidents on Railways	112	PROCEEDINGS OF THE INVENTORS' INSTITUTE.....	115	Statistical Society	117
Pickering on Physical Manipulation	113	MONTHLY NOTICES	115	Linnean Society	117
Sir W. Grove's Correlation of Forces	113	PROCEEDINGS OF SOCIETIES—		Anthropological Institute	117
Reviews Postponed.....	113	Royal Society	116	APPLICATIONS FOR LETTERS PATENT.....	117
CARMICHAEL'S ANTI-WAVE SHIPS	113	Royal Institution.....	116	ADVERTISEMENTS	118

THE TITLE-PAGE AND CONTENTS FOR THE EIGHTH VOLUME OF THE "SCIENTIFIC AND LITERARY REVIEW" ARE ISSUED WITH THIS NUMBER.

THE INVENTORS' INSTITUTE

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE.

Chairman of the Council—SIR ANTONIO BRADY.

THE various efforts which have been made, and the numerous influences now at work to injure, if not to destroy, Patent Rights; the inefficiency of the many well intended, but ill considered, schemes of Patent Law Reform which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor, without advantage to the Public; together with the proceedings so essentially involving the interests of inventors which have already taken place in Parliament, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organizing the influence of Inventors, Patentees and others. Its objects are:—

1st. To protect Inventors' interests and defend the privilege of obtaining her Majesty's Letters Patent.

2nd. To promote improvements in the Patent Laws.

3rd. To facilitate the diffusion of information with reference to Inventions and other subjects beneficial to Inventors and Patentees.

The qualification for Annual Members of the Institute is a yearly Subscription of One Guinea, and for Life Members a single payment of Ten Guineas.

Persons desirous of becoming members are requested to forward their names and addresses to the Secretary.

THE INVENTORS' PATENT-RIGHT ASSOCIATION,

LIMITED,

21, Cockspur-street, Charing-cross,
London, S.W.

Objects of the Association.

To obtain Patents for Inventions in this and other Countries at fixed and moderate charges.

To Register Designs.

To Sell and License Patented Inventions.

To form Public Companies, or otherwise arrange for the Public Introduction of Patented Inventions.

To furnish advice and Professional Assistance in developing Inventions.

To collect Evidence, arrange Arbitrations, and otherwise assist Inventors in maintaining their rights.

A Handbook gratis on application to

THOMAS MORGAN,

Secretary.

Recently Published, price 2s.,

THE LAW OF PATENTS FOR INVENTIONS. By F. W. CAMPBELL, of Gray's Inn, Barrister-at-Law.

London: Lockwood, Stationers' Court.

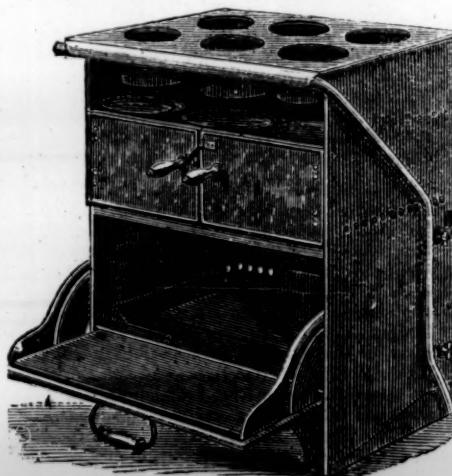
"ORTHODOX PHRENOLOGY."
Cloth, Second Edition, Illustrated.

This work is arranged for the special use of learners, also to show the harmony between Phrenology and the Anatomy of the Brain, and particularly to convert the Sceptic.

London:

SIMPKIN, MARSHALL, AND CO., Stationers' Hall-court.

THE ECONOMIC GAS RANGE AND ROASTER COMPANY.



ON SOUTHBY'S PATENT,

WHICH SECURES

PERFECT VENTILATION,

A 7lb. Joint Roasted to Perfection for One Half-penny.

Selected by the Commissioners for the International Exhibitions, 1871 and 1873.

A pennyworth of Gas, perfectly consumed and economised as it is under this Patent, does as much work as sixpenny-worth of Coal.

Positive immunity from every trace of smell or smoke is combined with perfect simplicity.

ROASTERS, from 10s. 6d. to £1 5s.

RANGES, £2, £3 10s., £6.

Estimates given for Fitting-up Hotels, Restaurants, and Large Establishments.

TO BE HAD OF ALL IRONMONGERS AND GASFITTERS.

WORKS—2, BASSETT STREET, MALDON ROAD, KENTISH TOWN, N.W.,

Where the Apparatus can be seen in operation; and at Mr. Woodcock's Offices,

23, ABINGDON STREET, WESTMINSTER, Where Mr. SOUTHEY can be consulted by appointment.



APPLICATIONS FOR LETTERS PATENT.

*. In this list (Com.) means Invention communicated from abroad.

Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur-street, Charing Cross.

On April 17th.—1324 to 1341.—N. J. Holmes. Self-igniting and inextinguishable danger signal lights for marine and other purposes.—W. S. De Mattos. Coupling and uncoupling railway vehicles.—C. D. Abel. Traction springs for vehicles (com.)—J. B. Robertson. Knitting machines.—T. Fell, sen., and J. Fell, jun. Looms for weaving.—G. Weir and J. Weir. Governors for marine engines.—J. Bailey. Apparatus for locking railway point and signal levers.—E. J. Taylor, A. Milsted, and E. Clark. Warming and ventilation of buildings. W. Johnston. Apparatus for compressing air or gases, or for forcing water.—John Taylor. Manner of treating risen flock patterned papers, so as to give them the appearance of damasks.—C. Batsford and E. Bloore. Rack pulleys and mode of manufacturing the same.—E. T. Hughes. Paper bags (com.)—N. Thompson. Connecting together pipes or tubes, and connecting cocks, tubes, or pipes to other articles.—G. Hookham. Fastenings for metallic travelling boxes, and other metallic boxes.—A. Wanchope and J. Cowan. Making gas, to be called Wanchope and Cowan's new patent compensating system for making gas.—A. M. Clark. Steam boilers (com.)—H. W. Hart. Steering apparatus and arrangement of the same upon a ship or other vessel.—A. Frolich and C. Steffen. Steam boilers.

On April 18th.—1342 to 1356.—D. Scattergood. Apparatus for the manufacture of looped and lace fabrics.—T. Obach. Ferries and apparatus for working the same, parts of which apparatus are applicable generally for winding or hauling purposes.—J. C. Coombe. Smelting and manufacture of pig iron.—J. Gaskell and J. Gaskell. Apparatus for the manufacture of castor bowls, knobs, and other articles of a similar description from plastic clay.—R. Cooke. Ruling machines.—C. J. Ball. Apparatus for drawing, with-drawing, and adjusting curtains, also applicable to other purposes.—F. H. Gossage. Manufacture of iron.—A. V. Newton. Construction of furnaces (com.)—E. T. Hughes. System of locomotion (com.)—J. D. F. Hald. Blast pipes for locomotive and other steam engines (com.)—J. Badcock. Method of trimming or bordering skirts of dresses and other like articles of dress.—E. L. Berthon. Equatorial telescopes.—B. J. B. Mills. Weaving carpets and machinery employed therein (com.)—W. Radeke and S. R. Smyth. Manufacture of peat into fuel and charcoal, and apparatus and appliances to be

employed for such purposes, being partly also applicable to the carbonizing of wood.—J. H. Robinson. Manufacture of enamelled dial and other plates.

On April 20th.—1357 to 1366.—L. Threlfall. Self-acting apparatus for closing doors.—H. Whitaker. Furnaces.—E. Breffit. Stopping and unstopping bottles, more particularly when such bottles contain aerated liquors forced in by machinery or generated within.—R. Johnson. Machinery for exhausting and propelling air gas, and other fluids and liquids.—E. R. Southey. Apparatus for destroying and preventing acidity in beer.—E. Pace and J. H. Howard. Forming splints into bundles.—J. Tinker. Shuttlers for weaving.—J. Midgeley. Ring-twisting machinery (com.)—J. Bullough and P. O. Whitehead. Machinery employed for sizing and drying yarn.—R. D. Hutchinson. Manufacture of cotton fabrics.

On April 21st.—1367 to 1383.—A. Hague. Apparatus for working signals. J. Barker.—Colouring paper or pasteboard, and the machinery or apparatus employed therefor.—B. T. McKay. Colouring blocks for printing.—N. J. Holmes. Life-saving apparatus at sea.—G. Whyte. Mode of signaling on railways by electricity, and apparatus to be employed therefor.—P. Brannon. Girders and other bridging members. (Complete specification.)—E. Schultz. Ordnance.—F. Wirth. Knitting machines (com.)—W. S. Macdonald. Boilers for generating steam.—W. Walton. Apparatus for mounting card filets on cylinders.—C. A. Wheeler. Latch for doors and casements.—L. W. Jelf. Portable raft propeller.—E. A. J. Buckland and W. Simpson. Construction of iron steam ships and other vessels.—F. Gambette. Water-wheel.—W. R. Lake. Apparatus for regulating the speed of steam engines (com.)—W. R. Lake. Machinery for manufacturing nails (com.)—J. Grantham. Tramway cars.

On April 22nd.—1384 to 1410.—J. F. Thys. Apparatus for cleaning, whitewashing, colouring, painting, and coating ceilings, walls, and other surfaces.—J. J. Clarke. Fasteners for corsets and other similar fasteners.—E. Smith. Hearth rugs.—J. Millward. Steam boilers and their furnaces (com.)—W. McNaught, senior, J. McNaught, and W. McNaught, junior. Steam engines.—W. R. Lake. Lubricating apparatus for steam engines (com.)—A. Crawford. Waterclosets, and water preventing water supply apparatus.—G. H. Forbes. Utilization of the foul or refuse lime of gas works.—W. Morgan-Brown. Knitting machines (com.)—W. Richards. Apparatus for indicating the receipt of moneys and for recording same.—M. H. Smith. Preservation of alimentary substances.—W. R. Lake. Instrument for marking or cutting scrolls and other curved figures (com.)—C. Rennick. Manufacture of artificial butter (com.)—C. A. Bluemel. Coating, surfacing, or ornamenting wood.—E. Hart. Means or agents for disinfecting and deodorizing purposes.—W. R. Lake. Apparatus for the treatment of rectal diseases (com.)—C. F. Humbert and D. Joy. Automatic repeating fire-arms.—F. Cole. Raising and lowering window and other sashes.—F. R. Clarke and W. Hilton. Automatic couplings for railway carriages and waggons.—W. R. Lake. Fire-places, and apparatus connected therewith (com.)—A. Gallico. Processes of extracting and refining copper, and apparatus for the same (com.)—B. J. B. Mills. Means for raising sunken vessels and other objects, which improvements are also applicable to submerging heavy objects in determined positions (com.)—W. P. Wyatt. Portable and other hot-air, vapour, shower, and medicated baths, and bath apparatus for curative and other purposes.—E. H. Taylor. Self-acting catches or fastenings for securing the doors of railway and other waggons or trucks.—J. A. B. Williams. Manufacture of artificial fuel.—J. H. Johnson. Locomotive and other tubular boilers and grate bars for the same (com.)—A. M. Clark. Springs for chairs and other articles of furniture, and for doors, vehicles, and other purposes (com.) (Complete specification.)

On April 23rd.—1411 to 1423.—J. Laird, jun. Packing or making up bags or sacks for shipment.—J. Taylor. Method of and apparatus for heating the feed-water for steam generators.—J. F. Spencer and W. Inglis. Means of starting steam engines.—H. S. Barron. Indicating the speed of rotating shafts or bodies, and apparatus therefor.—W. R. Lake. Method of and apparatus for the deodorization and utili-

zation of sewage (com.)—F. O'C. Robinson. Apparatus for indicating and recording the distance run by ships or other vessels.—D. E. P. Jones and D. Davis. Means or apparatus for cleansing tin orterne plates.—R. B. Sanson. Machinery and apparatus for ironing, pressing, or smoothing cloth and other textile fabrics, and garments or other articles formed thereof, and for other like purposes.—H. Stanwix. Mortising machines.—J. H. Johnson. Paper hanging (com.)—W. R. Lake. Machinery or apparatus for indicating the number of revolutions per minute made by a rotating shaft (com.)—J. Noad. Manufacture of steel and of dies and other articles in steel.—W. G. Fearnley. Means for heating ovens.

On April 24th.—1424 to 1440.—M. Wilson. Apparatus for supplying oxygen in rooms and other closed places wherein the air is vitiated by the burning of gas or other lights.—R. R. Horne. Refractory or fire-resisting material.—J. Towle. Means employed for collecting, treating, and distributing sewage.—J. Purdie. Rivetting and other apparatus to be used in constructing ships, bridges, and other metallic structures.—E. Budde. Process for preserving eggs by means of the carbonic anhydride and alkaline silicates.—D. Jones. Lubricating cylinders and valves of steam and other engines. (Complete specification.)—W. Thomson. Tube-expander.—W. Brookes. Apparatus for warming railway and other carriages, and other places and buildings (com.)—R. Chalk. Fire-grates.—E. T. Hughes. Spade bayonets and bayonet fastenings (com.)—B. Templar. Tidal-power machine.—C. Lowe and J. Gill. Manufacture and separation of certain mixed coal tar products.—S. Mason jun., and M. Alcock. Apparatus for utilizing the waste heat from steam boilers and other furnaces.—B. Marsden. Machinery for making bolts, spikes, and rivets.—R. Werdermann. Method of cutting rock or stone and other hard substances, applicable for tunnelling, mining, and quarrying, shaping, or dressing stone, and for other like operations.—W. Crabtree, W. H. Bottomley, and J. Naylor. Looms for weaving, and apparatus connected therewith.—C. Denning. Hay-making machines.

On April 25th.—1441 to 1451.—A. Atkinson. Bricks and tiles.—J. W. Wignall. Apparatus for clocks, musical boxes, and other similar purposes.—E. P. H. Vaughan. Apparatus for facilitating the whetting of graving tools (com.)—G. L. Scott. Machinery for forging metals, applicable also to other stamping purposes.—W. Morgan-Brown. Printing music, and the apparatus for that purpose (com.)—J. H. Johnson. Production of electric light, and the apparatus employed therein, parts of which apparatus are also applicable to other electrical purposes (com.)—H. Guillery. Splints for surgical purposes.—A. L. Rawson. Use of petroleum and such like oils for obtaining heat to steam boiler and other furnaces or fire places, and means or apparatus employed therein (com.)—T. E. Knightley. Fire-proof store houses suitable for warehousing furniture and for other such like purposes.—W. G. S. Mockford. Treating guano.—J. G. Tongue. Dyeing wool and silk fabrics or materials (com.)

On April 27th.—1452 to 1469.—J. M. Stanley and H. James. Appliances for milking cows.—D. K. Clark. Machinery and apparatus for disintegrating and straining partially fluid or semi-solid substances.—J. David. Compound of lead applicable to the purposes for which white-lead and red-lead are employed, and the process of producing such compound from galena.—A. B. Childs. Machinery for cleaning grain, rice, or seeds, or bolting flour and separating and purifying middlings made therefrom.—G. H. Rich. Window blinds for railway and other carriages, also for windows in houses.—D. Carlaw. Mangles.—W. D. Scott-Moncrieff. Locomotive carriages for tramways or common roads.—M. A. Wier. Apparatus for indicating and registering the speed of revolving machinery, and of certain other moving objects.—A. G. Lécouyer. A system of transformation of the French gun, model 1866.—E. Linglin. Conical pendulum. H. Shaw, W. Ditchfield, and J. Knowles. Power looms for weaving, and apparatus for cutting and separating pile fabrics when woven double, face to face.—E. P. Alexander. Shot cartridges (com.)—A. Pilling. Washing machines.—R. Owen. Manufacture of paint from a black powder obtained by the utilization of a chemical by-product or refuse hitherto considered useless,

and for improved apparatus connected therewith.—W. T. Mann. Feed water heater and furnace covering for steam boilers, more particularly adapted for "multitubular" used on "copper walls" (com.)—A. Roberts. Venetian blinds.—W. F. Pitchford. Apparatus for the manufacture of lead, tin, and other soft metal piping.—C. Stevenson. Evaporating or recovering furnace or apparatus to be used for evaporating the water in soda lye or liquids containing any valuable sediment or body, so that the same may be rendered fit for being again used for manufacturing purposes.

On April 28th.—1470 to 1486.—E. E. Middleton. Method of building and altering, by lengthening by the stern, the after hull of yacht, sailing boat and other vessel.—J. A. Cotton. Method of providing a foothold for horses on asphalt and other similar pavements.—P. Brannon. Mode of decorating pannels, slabs, or blocks for buildings and other useful purposes. (Complete specification.)—E. Devan. Treating flax, hemp, jute, and manilla in the manufacture of paper pulp.—W. Baker. Manufacture of white and red lead and litharge.—A. Fayol. Apparatus for preventing leakage, adaptable on candles.—J. A. R. Morison. Construction of roadways and other surfaces.—W. Hayden, jun. Apparatus for guiding piston rods and other parts of machinery which move in a straight line, so as to preserve their parallelism, commonly called a "parallel motion."—G. W. Bentley. Manufacturing compressed leather.—M. P. Lvoff. Preparation of iron made of wire, for purposes where great tensile strength is required, and specially for guns, cannons, plates, axles, chains, and telegraph wire.—J. A. Chandor. Ignition fuses (com.)—W. R. Lake. Machine for burnishing photographs, cards, and other like articles (com.)—J. W. Butler. Apparatus for moulding concrete pipes, and preparing the materials therefor (com.)—J. Crowley, jun. Apparatus for raising and lowering weights or heavy bodies.—S. Fox. Apparatus for softening and straightening steel wire and for cutting it into lengths suitable to form the ribs and stretchers of umbrellas.—S. Fox. Apparatus to be used in rolling steel for the manufacture of wire.—S. Fox. Manufacture of steel girders and railway rails.

On April 29th.—1487 to 1504.—J. S. Wallace and E. Tucker. Apparatus for protecting warehouses and other buildings and ships from fire, also applicable to the preservation of iron safes and similar receptacles and their contents.—T. B. Pye. Arrangements or apparatus for feeding liquors to fermenting vessels and conducting the barm or scum therefrom.—R. Brydon, J. S. Davidson, and G. Grey. Apparatus to be employed for boring or sinking.—J. W. Lee. Manufacture and working of direct-acting pumps.—J. C. Sellars. Manufacture of metal founders' blacking.—H. J. Brook, E. G. Draper, and J. Unwin. Preparation of articles to be electro-plated or coated with nickel and other metals by electricity.—W. Baker and J. Unwin. Preparation and the electro-deposition of nickel upon metals.—J. Jordan. Machinery or apparatus for cutting, dressing, and quarrying stone; also applicable for cutting coal.—W. F. Rutter. Combination locks. (Complete specification.)—J. Moore. Construction of machinery for manufacturing bricks, tiles, slabs, and blocks for building and other purposes.—J. A. Peer. Machine for cutting (toothed wheels and racks), the wheel banks being turned and the teeth cut without removing from their centre. (Complete specification.)—T. Prentice. Screens for screening corn and other grain and seed.—T. Bjarnason. Scythes.—N. D. Spatall. Apparatus for obtaining and applying motive power.—J. Carriek. Apparatus for respiratory and inhaling purposes.—S. Brooks, G. Harrison, and T. Goodbehere. Machinery for spinning and doubling.—F. J. Cheesbrough. Spark arrester for locomotive and other engines (com.)—H. Jacobs and J. Munt. Fire lighter and fuel.

On April 30th.—1505 to 1526.—S. D. McKellen. Methods of and means for impelling the pendulums of horological or other apparatus.—H. T. Cutts and J. Dean. "Check actions" of venetian blinds and for other purposes.—T. Rowan and J. R. Reid. Manufacture of fabrics usable as floorcloths or otherwise.—F. Wirth. Steam boilers. F. T. Bond, M.D. Filtering and purifying water and other liquids.—F. T. Bond, M.D. Materials for disinfecting and deodorising purposes.—J. Edwards. Brakes for
(Continued on page 117.)

Scientific and Literary Review,

AND RECORD OF PROGRESS IN

ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

JOURNAL OF THE INVENTORS' INSTITUTE.

AUGUST 1, 1874.

EDUCATIONAL ENDOWMENTS.

The promotion of advanced education for the people of that practical scientific kind which is sometimes termed technical education rather than that of the old classical and abstract mathematical order, is, to us, a matter of the very first importance, since we believe it to be just the kind of education which the maintenance of the industrial position of the country stands in need of; from embracing those branches of knowledge which are useful in practical life, whilst they enlarge the sphere of thought by teaching that the things around us are worthy of more than a passing glance or occasional appropriation to our wants, it being quite true that we may find

"Sermons in stones, and good in everything,"

not only in the religious didactic sense appreciable by the man of piety and the moralist, but also in a sense which readily commends itself to the philosopher.

We are not of those who would in any way diminish the dignity or underrate the value of scholastic lore of the old kind; it has been, and will, doubtless, continue to be, valued by the theologian, the orator, the scholar, and the gentleman; but the thoughts of the great men of antiquity have now been so well presented to us by the labours of learned and talented translators that the study of them in their original languages is not nearly so important as in years gone by; and as this kind of study and its concomitant academic routine, which deal with words rather than thoughts or things, has, in public estimation, obtained the supreme position as the right sort of mental training for all who wish to obtain what is termed a respectable position in society, there is no danger of this system of education being underrated, though it is probably much over-rated.

Regarding the educational question in this way we cannot say that we feel any great regret that the present Government, by its unadvised action in relation to our system of endowed schools—in other words, our secondary or advanced schools, or grammar schools—should, by such action, have made the subject of endowed school education a principal topic of the day, for we hope that an opening will thus be afforded for a successful public movement in favour of turning most of these schools from mere seminaries for classical learning and religious teaching, according to the formularies of a particular religious body, into endowments for advancing that kind of practical education we have referred to.

Whatever may be the fate of that part of the Endowed Schools Act Amendment Bill (at the time we write before the Legislature) restricting the benefits of such schools to one religious body, it seems likely that the present Endowed Schools Commissioners will be got rid of, and we cannot say that we are sorry to think it will be so, for they are men who have neglected great opportunities for doing immense public good. The Commissioners might have endeavoured to render these school endowments supplemental to our elementary school system, by providing schools where the education of intelligent children of working men and other unwealthy persons could, by reason of the pecuniary aid afforded, be continued, so that such children would become well instructed in the use of the English language, and especially in all the practical sciences, thus fitting

them to go forth into the workshop or the warehouse with a stock of really useful knowledge, that would enable them to become first-class workers in our industrial and commercial establishments, and with minds capable of broad views of the things of life around them. Instead of doing this, the Commissioners seem to have done little else than split up schools which professed to supply a high-class education of the old-fashioned kind into a larger number of schools, in which the same kind of education, somewhat diluted by modern "ologies," should be afforded to the children of parents of tolerable pecuniary means, who must pay fees for teaching alone amounting to nearly as much as many a good private school would undertake to teach and feed children for.

Truly this question of public education is by no means well understood. We have in this country magnificent pecuniary provision for education, but what becomes of it? A large portion is applied to the benefit of our rich noblemen and gentlemen who have invaded the patrimony of the poor at such institutions as Eton, and other public schools of that class. Another large portion is appropriated by the well-to-do sections of the middle-class, whilst for the poorer sections of that class, and the working classes generally, something is done in the way of supporting such institutions as Dickens termed "Charitable Grinders," which are powerful agencies for moral debasement, and powerless for advancing education.

It must never be forgotten that the wage classes are persons who cannot afford to keep their children away from industrial employment after the age fixed by the elementary school; very many cannot afford to do that much, hence, however intelligent a child may be, he has no chance whatever of obtaining any secondary education worth speaking of unless he obtains some endowment whereby he is both taught and fed; and it must be remembered that even then, the loss of the wages the child might soon earn would be likely to be missed from the weekly pittance, so that, under even these favourable circumstances, the parent would sacrifice a good deal for the child's future advantage. Thus, no system which does not give absolutely gratuitous instruction, and afford the means of living, aye, further, have an eye to the subsequent placement of children in industrial and commercial life, will be any great public good.

Of course, when we write this, we do not mean that endowed advanced education ought to be given to every poor child, for we assume it will be extended to such children only as upon examination are found to promise to benefit by it. Nor do we advocate that when a child shows a decided bent for classical, literary, and other scholastic studies, opportunities for encouragement of his talents should not be provided.

But independently of schools technically so-called, we have amongst us educational agencies that have never yet received the recognition and encouragement they deserve; we allude to the institutions termed Birkbeck, Mechanics', Working Men's Literary and Scientific, and so forth. Whatever may be their shortcomings, they are, without doubt, People's Colleges; and, if some small portion of our educational endowments were bestowed upon them upon conditions judiciously framed, so as to induce a larger number of the intelligent youths of the wage classes to make use of them, they are quite capable of doing much good for the educational advancement of the people; because they do not necessitate the withdrawal of youths from the active business of life. But to make these institutions extensively useful they generally require to be assisted in the matter of rent and building, and to fill them prizes for attendance and for merit should be liberally provided for. Indeed, something in the way of evening schools might be combined with these institutions.

We are well aware that to fully advance technical education all this must be followed up by a system of technical colleges and universities conferring technical degrees; and it would be well if something could be done to endow such institutions.

However, as we find by the *Times* that working men have been giving attention to the subject, we hope that we shall soon have to speak of something practical being done.

Reviews.

ENGLISH SALMON FISHERIES.

"Thirteenth Annual Report of the Inspectors of Salmon Fisheries (England and Wales)." London: Eyre and Spottiswoode. 1874.

GIVEN a subject which requires Government intervention and the right men appointed to act in the matter, and anyone, though not a prophet, or the son of a prophet, may safely predict a satisfactory result; therefore, whilst we have two such men as Dr. Buckland and Mr. Walpole acting as Inspectors of Salmon Fisheries, no one will feel surprised at public approbation being bestowed on their labours. That their labours have been considerable, and that they have been attended with great advantage, no one who duly considers the question can doubt. It does not require anyone to be very old to remember the time when salmon was very much more plentiful, and consequently cheaper, than it now is; and, also, that it afterwards so increased in price till it became considerably higher than it is at the present time; this was owing mainly to pollution of salmon streams, and also to the non-observance of "close time." These two evils have been well met by the Government Inspectors, and the Blue-book before us details the inspectorial work during the past year.

Mr. Buckland's report, as might be expected, is practical and scientific. As regards the price of salmon, he says:—

Salmon at the beginning of the season of 1874 were remarkably cheap, falling as low as 10d. per pound, whereas the general price per pound for spring fish is 2s. 6d. The credit for this unusual supply of fish may be said to be due to the products of Scotch and Irish fisheries. It is, however, certain that the fisheries of England and Wales have contributed largely to the abundance of salmon in the spring of 1874 and to the reduced price of fish in July in August 1873.

The pollution of rivers naturally received much attention from the inspectors on this subject which Dr. Buckland justly viewed as of far larger public importance than as it affects salmon fisheries. He says:—

The question of the future treatment of pollutions of rivers demands most serious attention from the Legislature as representing the interests of the public. It is obvious that all legislation will be of little or no avail if the water in which the fish live and breed is unsuited for their existence. The question of the pollution of rivers is too large to be treated by those interested directly or indirectly with salmon culture; it practically and directly concerns every individual of her Majesty's subjects. The question of pollutions of rivers is therefore really the principal question of the day.

Pollutions may be generally classified thus:—

1. Pollutions from towns.
2. Pollutions from mines.
3. Pollutions from manufactories.

I am sorry to report from my own observation, that most of our rivers are more or less utilized as sewers by the towns upon their banks. As notable instances of this, I give the Severn, which is made to receive the sewage of Gloucester and Worcester, &c. The Ribble is terribly fouled by the pollutions of Preston. The fishermen of the Cumberland Eden complain of their nets being frequently filled with the sewage of Carlisle. The state of the Exe from the sewage of Exeter, just above Trews weir, demands the immediate attention of the local authorities. The manufactories of the Tyne persist in pouring out poisonous substances from Jarrows creek. Seaton seriously injures the Devonshire Axe. Canterbury sewage handicaps the efforts of the conservators to restore migratory salmonids to the Stour. The Medway can now be hardly called a river at all, but is rather a

"pactolus," the waters of which are of the most impure nature, threatening great mischief some day to the inhabitants of Maidstone and its neighbourhood. The town of Taunton has taken steps to divert its pollutions from the Tone, but at my late visit the river by the sewer presented a state of filthy mud.

There are many other cases of pollutions of towns injuring rivers, but I have not space to mention them all. The question of the disposal of town sewage is difficult of solution, while, at the same time, considerable expenditure of capital is required to carry it into effect.

It is perfectly obvious to my mind that the land and not the river is the proper place to receive town sewage. I give at page 55 of this present report, an analysis of sewage falling into the Ribble. From this it appears that the chemical ingredient which most abounds is ammonia. Now ammonia is a substance highly prized by farmers, and it seems strange in these days of scientific engineering, combined with the progress of practical and agricultural chemistry, that large sums of money should be yearly expended by our farmers to purchase from abroad ammonia and phosphates, while at the same time tons of these valuable substances are poured into the water, and sent drifting down our rivers to poison not only the fish, but also the people who live lower down the river. It is unfortunately often necessary that waterworks (notably in the case of the Thames) are obliged to pump up into dwelling houses water which but a few miles above was highly impregnated with sewage. It is impossible that any amount of filtration can ever render the water as pure as it would be if the sewage had never been put into it at all. This is a fact unpleasant to think of, but yet I wish the public to realise that it is a fact, as then and then only will it be made imperative for the authorities of all towns either to convert the sewage into food for plants instead of poisoning the fish, or else send it down, by means of pipes or culverts, to waste places where it can do no mischief.

I make it my business to examine the mouths of all sewers flowing into salmon rivers, and am therefore practically acquainted with the great injury that accrues to salmon fisheries through town sewage.

The arrangements for facilitating the breeding of salmon, as might be expected, received much attention. However, no particular passage will illustrate this, since, at many different pages, the subject is referred to.

As to close time, which receives much attention, Dr. Buckland makes the following general statement:—

I do not hesitate to state that there ought to be a close time, or else a regulation for the mesh of nets, for sea fish within the three mile limit during certain weeks of the spring months, when the sea fish come from the deep towards the shore to spawn.

The report of Dr. Buckland gives a table of returns of salmon sold at Billingsgate, supplied to him by Messrs. Forbes, Stuart, and Co., of Lower Thames-street, and concludes as follows:—

The table shows a slight increase in the number of English salmon sold in Billingsgate and a considerable increase in the number from Scotland and Ireland. In taking these figures into consideration, it must not be forgotten that the bulk of Scotch salmon is sent to London, and large numbers of Irish fish are exclusively sold there, while the markets for English fish are not merely in London, but in all the large provincial towns, in the neighbourhood of which salmon are caught.

In concluding this report, I have great pleasure in expressing my satisfaction with the present condition and future prospects of the salmon fisheries of England and Wales. The public owe very much to the

chairman and members of the Boards of Conservators throughout the kingdom for their most praiseworthy exertions to carry out the law and to increase the supply of public food. Nor must it be forgotten by any interested in the multiplication of salmon as well as in the commercial aspect of this important branch of national industry, that great thanks are due to the Select Committee of the House of Commons and especially to Mr. Lewis Dillwyn, M.P., chairman of the committee, for the labour and pains they have bestowed in framing the new Act of 1873.

That this new Act is a wise measure carefully cast in accordance with natural facts and with due consideration for all rights and interests there can be no doubt. I venture, therefore, to hope that we are now in 1874 entering upon a new era of increased prosperity for the salmon fisheries of England and Wales.

Mr. Walpole's report is a very comprehensive and detailed account of the working of the Salmon Fisheries Acts, and concludes with the following important remarks as to the pollution of rivers:—

If, then, river preservation is to be continued, some steps must be taken to remedy the evils of river pollution. No one can doubt that the time is ripe for the change. A very able Commission has, in a series of very able reports, dealt exhaustively with the whole subject. The Government has displayed its anxiety to deal with it by attempting to give legislative effect to the recommendations of the Pollution Commissioners. An independent nobleman has reproduced in the House of Lords the proposals which the Government had made in the House of Commons, and a Select Committee of the former House has pronounced its opinion in favour of the reform. It cannot, then, be urged that the time for remedial legislation has not yet arrived. The points on which legislation must be founded are clearly before the country. From what I have already said it will be seen that I do not advocate reform on this subject merely on fishery grounds. The demand for pure water rests on higher grounds, and it is only a subsidiary advantage that the production of fish will be increased by the change. But it cannot be too distinctly understood, that, unless some such reform is carried, our fisheries are threatened with a gradual decay. Neither legislative nor administrative efforts can compensate for the want of pure water; and pure water is, in this country, gradually becoming more and more scarce. If, then, the efforts of our Conservators are to be attended with the success which they deserve, some steps must be taken to remedy the evil of river pollution. In default of such a remedy our rivers can never produce the amount of food which they might otherwise easily yield.

Appendices give tabular statements as to various matters coming under the cognisance of the inspectors. On the whole, this is one of the most practical and readable of Blue-books, conciseness and precision being equally well attended to.

ACCIDENTS ON RAILWAYS.

"A Treatise upon Railway Signals and Accidents." By ARCHIBALD D. DAWKAY, Assoc. Inst. C.E. London: E. and F. N. Spon, 48, Charing Cross. New York: 446, Broome-street. 1874.

THIS is a very useful compendium of scientific and practical information on those important subjects, railway signals and railway accidents. The work is divided into several parts:—1. The development and form of signals in use upon railways from the earliest time, which seems to be a succinct yet comprehensive statement of that part of the matter. 2. The various patents and improvements deserving of notice, which to our mind is not so complete as it might have

been, for the writer seems to have confined his notices (which, it must be owned, are fairly descriptive, and often accompanied by illustrative cuts) to those plans which have been brought into use or actually tried, but we think he would have found some practical merit amongst those which at present only exist on paper or parchment amongst the Patent Office records; for instance, the locking gear, patented, not three years since, by J. Ford, of Reading, maybe considered to be worthy the attention of practical men. However, Mr. Dawney would doubtless clear himself on this head by pointing to the size of his work, which is that of a thick pamphlet. The third part of this useful production relates to the practical results of the several systems deduced from the accidents which have occurred, a portion of the work of a very satisfactory character, as is the fourth part, which is devoted to the consideration of what method of signalling and working of traffic appears most desirable to ensure safety. In an appendix much information is given as to Board of Trade requirements and recommendations also important correspondence between that Board and the railway companies.

PICKERING ON PHYSICAL MANIPULATION.

"Elements of Physical Manipulation." By EDWARD C. PICKERING, Thayer Professor of Physics in the Massachusetts Institute of Technology. Part I. London: Macmillan and Co. 1874.

THIS work is, we may say, a peculiar one, and we cannot call to mind one of the same character, and based on the same footing. It is by an American author, and written as a text book to be used by the student in the laboratory for teaching physics. The author informs us that to meet the wants of the student of physics the present work has been prepared, based on experience gained in the Institute of which he is one of the professors.

The work opens with a chapter devoted to general methods of investigation, analytical and graphical, and the more common applications of the mathematics to the discussion of results. The graphical method, with some new developments of it, is compared in this chapter with the analytical method; a short description of the various methods of measuring distances, time, and weight; the chapter, as a whole, being intended, the author says, as a ground-work of a short course of lectures given to the students before they begin work in the laboratory. After this preliminary chapter that part of the work follows which bears on the various branches of physics, a peculiar point being the arrangement of its contents, each experiment being divided into two parts, the first called Apparatus, giving descriptions of the instruments required, and designed to aid the instructor in preparing the laboratory for the class; this the student is first to read over, and with it the second part, in which each experiment is divided, entitled Experiments, which explains in detail what he is to do.

In the description it is assumed that each set of apparatus for each experiment is confined to one table, and this, to say the least, would entail considerable expense, as it would mean having duplicate sets of apparatus of costly instruments, which only a college or laboratory with a large endowment could afford; but, of course, we would assume that where the same piece of apparatus was wanted for another experiment it might be moved.

Chapter II. contains 22 experiments bearing on the general subject of physics; the next chapter having 20 experiments on the mechanics of solids, amongst which are experiments on composition of forces, coefficient of friction, and the laws of tension,

and torsion. Falling bodies, and the mechanics of liquids and gases forms the next chapter, which contains 18 experiments.

Chapter V. is taken up by sound, on which important subject only 6 experiments are given; and the next and concluding chapter of this part is occupied with 28 experiments in relation to light.

We have thus given a *resumé* of the contents of this part of the work, which is clearly and ably written, and we cordially recommend it to the careful consideration of every teacher and student in physics, who should have it always by him. We like this first part so well that we shall await its continuation by the second part bearing on heat and electricity as promised by the author.

SIR W. GROVE'S CORRELATION OF FORCES.

"The Correlation of Physical Forces" (sixth edition), with other Contributions to Science. By the Hon. SIR W. R. GROVE, M.A., F.R.S., one of the Judges of the Court of Common Pleas. London: Longmans, Green, and Co. 1874.

ALTHOUGH, as regards correlation of physical forces, this is the sixth edition, and the other matter has already been brought before the public, yet the importance of the subjects treated, and the philosophical eminence of the author, induce us to now state for the benefit of such of our readers as it may concern, that this work, containing, as it does, various contributions to science of the highest interest, ranges over a vast field of philosophical thought and experimental research in a way in which not only scientific men, but any man of education and intelligence can follow the author with profit; and, further, that we intend to give a more detailed account of its contents hereafter.

REVIEWS POSTPONED.

WE are compelled to postpone our reviews of the following books:—

"Tyer's Block Telegraph and Electric Locking Signals" (fifth edition).

"Rules of Evidence as Applicable to the Credibility of History." By William Forsyth, Q.C., LL.D., M.P.

"Influence on Homœopathy in General Medicine since the Death of Hahneman." By R. E. Dudgeon, M.D., Edin. London: Henry Turner and Co.

"Early History of the Property of Married Women." A lecture by Sir H. Maine. Manchester: A. Ireland and Co., printers.

CARMICHAEL'S ANTI-WAVE SHIPS

At the meeting of the Inventors' Institute, on June the 11th, 1874—Mr. C. G. Carttar presiding—the discussion on the subject treated of in Dr. Carmichael's paper, with the above heading, which we have already placed before our readers, was the business for transaction that evening.

The paper having been read, the Chairman stated that as it had been published in the Journal of the Inventors' Institute nearly two months ago, and as it referred to a most important matter—the neutralisation of the effect of the waves on sea-going vessels—it would, he hoped, be discussed in a comprehensive and exhaustive manner.

Mr. MURRAY remarked that in ship-building all straight lines were wrong, and therefore he thought Dr. Carmichael would do well to modify his invention, so as to reduce straight lines to curves. As regarded the use of a screw propeller in a tube, he feared that arrangement would not propel well, and such a vessel as that of Dr. Carmichael's, he considered, could not be steered unless the rudder was of the length of half the beam of the vessel. The author of the paper seemed to think it would be of advantage if his vessel should lie like a log on the water, but all his (Mr. Murray's) experiences of sea voyaging convinced him that a lively boat was what seamen liked. At the same time he was quite ready to admit that

Dr. Carmichael's vessel was not likely to be thrown on her beam ends.

Mr. CALLEY said that his experiences would lead him to doubt whether the sloping sides of the vessel would, in a heavy sea, slope at all; rolling of 27° would very nearly bring the side to a level, and he could not see that the mode of propelling by means of a screw enclosed in a tube could be a good practical arrangement, for as far as he could see there would be a choking action.

Mr. M. M. HARRIS remarked that in the United States there were plenty of flat-bottomed or approximately flat-bottomed ships of large size, which were found very satisfactory, and Dr. Carmichael's ship, if not flat-bottomed, was what might be termed flattened at the bottom. Although the various objections already urged were very cogent, yet he considered a vessel constructed as described would possess the great merit of being arranged in accordance with sanitary principles.

Mr. MORGAN thought that in discussing this matter an erroneous assumption had been adopted, namely, that the form and construction of the vessel were inseparable from the propelling arrangement, but this was, in reality, not so. The peculiar construction of vessel could be adopted with any other suitable means of propulsion.

Mr. CARTAR considered that after all due weight had been given to the various objections to Dr. Carmichael's plan, there yet remained a favourable view of it, which appeared to be of great importance, namely, that it would be a vessel little agitated by the waves, and not liable to be upset, and eminently well adapted for giving effect to sanitary principles. Further, although so much objection had been taken to Dr. Carmichael's proposition, yet the invention was one of considerable importance, and he would now close the discussion by moving a vote of thanks to Dr. Carmichael for his interesting paper.

Mr. M. M. HARRIS, in seconding this vote of thanks, would take the opportunity of mentioning that this was the last members' meeting of the session, which he thought everyone would agree had not been a barren one, whether as regarded the topics of discussion at the meetings, or the way in which they had been dealt with. In no case had the matter for investigation been wanting in practical importance or its course other than comprehensive and practical. He was glad to know this was the real state of the case, for he considered it of the very greatest importance that the Inventors' Institute should be, *par excellence*, a practical body, quite alive to the eminence and importance of pure science; but always more interested in the practical than the philosophical phases of scientific research. Though inventors' were not numerous, they were doing what was, without any exception whatever, the most important work for civilized life; and, therefore, their Institute must in all consistency keep far away from the character of *dilettante* would be improvers of arts, manufactures, and commerce. Amongst the various questions suitable for consideration, the Patent Laws had not been forgotten, and he was happy to say (as they would learn from the Journal of the Institute) the matter had been put in train with the present Ministry in such a way that he hoped before the next session of the Institute commenced some arrangement in furtherance of Patent Law Reform might be come to with them. In the hope of a happy reunion with his friends and fellow members next session, he would now wish them health, wealth, and happiness, not forgetting holiday enjoyments.

Mr. CAMPIN supported the vote of thanks to Dr. Carmichael, which was carried unanimously.

Mr. MORGAN moved, and Mr. MURRAY seconded a vote of thanks to the Chairman, which was carried unanimously, and this terminated the meeting.

Correspondence.

GOVERNMENT INDIFFERENCE AND INVENTORS' RIGHTS.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—Nearly two years since, in your October issue for 1872, you allowed me to review and analyze the composition of the Patent Laws Special Committee, then sitting in the House of Commons.

To any of your subscribers taking the trouble to read that analysis, with the conclusions arrived at by me from it, they will appear in the main fully proved. The Committee has, since then, again sat, done what was intended, viz., hatch an addled egg, bamboozle both inventors and the public, report to the House, and do nothing; in all which they have succeeded to perfection.

My attention is again specially drawn to the patent grievances by your correspondence with the three principal State officials, published in your last number. Your letter invited conference with them on the reduction of stamp expense, with other projected amendments of patent law, upon which the deputations you proposed could have considerably enlightened the Government. Let us examine the nature of the replies you received.

The Chancellor of the Exchequer is refreshingly candid; with admirable simplicity he admits his ignorance of the whole matter; and although a leading part of the subject is fiscal, and legitimately within his department, he declines inquiry.

The Lord Chancellor pleads the stereotyped pressure of business, or, in other political words, you are too ridiculous to be important. But the cream of all is the Premier's answer (whom I should be sorry to think laughed when sending it you). "If you will submit your statement in writing, it shall have my best," &c., &c. And so ends the farce.

Sir, there is but one mode of altering this studied indifference to the interests of inventors, interests upon the proper protection of which I affirm much of our national prosperity and commercial supremacy depends.

It is the deliberate intention and gain of capital to steal the brain of invention. To this end much of its force is energetically directed. To it it is ever alive, while the inventor, poor simpleton, sits mildly by, supinely looking on at the act of spoliation, now and then spasmodically starting up from the reverie he has fallen into to find himself systematically cheated of his first fruit and reward.

There is no royal escape from this; inventors are but units in the aggregate body politic, who, if they desire protection, must fight like the rest of common mortals for recognition. The public will never know of their claims unless allied with proper discretion—they are loudly uttered. Discretion is present in the Institute, but where is the requisite force? It is not enough that there should be an Inventors' Institute with official staff, labouring to obtain justice for its clients. Such labour, however well directed, will fail of its object unless actively supported by the clients in whose interests it is made. To meet periodically; to hear a paper read; then for ten minutes to admire, by resolution, the indefatigable zeal of the president, secretary, and so forth, to criticize a report and prospect without adding force to advice, is but another edition of Sisyphus stone-rolling.

Let me venture to indicate the present pressing duty of inventors. If they are asleep to their interests their enemies are not. It is assuredly an intention so soon as it can be decently accomplished, to abolish all patent protection. The indifference not of this Government alone, but of all Governments in listening to inventors' complaints sufficiently shows the direction of the current. All parties, therefore,

concerned cannot too quickly look to it. Let them read the digest of the committee's evidence and reports, given in former numbers of this Review. They will soon learn how their rights are strained away and jeopardised. Let that knowledge be followed up by each one writing to his M.P., wholly repudiating the report as being drawn from fallacious data by those notoriously opposed to all protection.

The present Patent Laws, by means of the varied tinkering and muddling of past years, are now in such a delightful state that no one's rights are assured by them, save that the most successful under them obtain the right to litigate, a terrible instrument in the hand of the capitalist, but a crushing curse to the poor inventor. Still, although there has been so much legal rubbish foisted upon them, the underlying principle of our Patent Laws is to give legal protection for invention, which, however, persistent capitalist legislation has so befogged, to the end that they may be swept away as a common nuisance with the consent of the community. Assuredly this is not the aim of inventors. Their interest is cheap, swift, and certain protection for their indubitable right of property in their own products. No committee of the House as at present constituted will concede this, while *ex parte* legislation must not be for a moment considered. Unless Government and the Legislature is prepared to accept as the basis of a Bill the suggestions of the Inventors' Rights Bill, which you have repeatedly published, founded upon conclusions come to after careful study, combined with an intimate acquaintance with the matter, the requirement is a full and efficient examination into the whole state of the laws on this subject. Committees of the House at best, for want of time, cannot deal with these, their forte is special questions, with a necessarily circumscribed range of vision. What is wanted on a subject of this importance is a Royal Commission, upon which every phase of interest, prominent amongst others that of *working men*, could be represented, and which, comparatively speaking, unlike a sessional committee of the House, would neither be tied to time or place of sitting; it could gather evidence anywhere and everywhere, and, as in the case of the Friendly Societies Acts, by the help of assistant commissioners, present us with an exhaustive report on the whole question, which is now in too complex a condition to be summarily dealt with by doctrinaires of any school.

If legislation of the right kind cannot now be had, for a report of this character we can afford to wait two, or even three, years. Certain I am that its publicity would compel justice being done to an oppressed, but very essential, class in the making-up sum of our general weal.

THOS. MOTTERSHEAD.

Lambeth, July 15th.

ANCIENT ROME.

At the meeting of the Royal Society of Literature on the 24th of June, 1874, C. Clark, Q.C., in the chair, Mr. Vaux read an interesting paper "On the Commerce of Ancient Rome with the East," in which he traced, at considerable length, the course of trade between the West and the East from the time of Solomon to that of Justinian, showing that the Romans were the inheritors of a commerce long previously existing, chiefly from the time when Egypt became a Roman province after the battle of Actium.—Mr. Vaux expressed his opinion that Roman influence in India was very great in the first three centuries of our era, and pointed out that this was confirmed by the constant discoveries of Roman gold coins of the Empire in Southern India. At the same time, he did not endorse the views of universal sovereignty put forward in France by M. Reinaud and M. Beulé.

OBSERVATIONS ON AN ECLIPSE.

At a recent meeting of the Astronomical Society, Professor Adams, President, in the chair, a paper by Mr. Stone, the Government Astronomer at the Cape of Good Hope, was read, describing his observations of the eclipse of the 16th of April, made near Klipfontein, in South Africa. Just before the total phase the slit of his spectroscope was placed tangentially at the centre of the disappearing crescent. At the instant of totality the field of view of his spectroscope appeared full of bright lines, but the greater number of them quickly vanished, leaving only the ordinary prominence spectrum. He next examined the spectrum of the corona at some distance from the moon's limb, and found it to consist of a faint solar spectrum, in which he could with certainty trace the principal dark Fraunhofer lines and of one bright line, the position of which he measured, and found it to coincide with 1474. Mr. Bidder described a micrometer which he had contrived for measuring the position of very faint stars. Ghosts of the wires, which can be rendered dimmer or brighter at the discretion of the observer, are projected into the field of view by means of reflecting prisms; and diaphragms can be used, cutting out the light of the wires from any portion of the field. M. D'Abbadie was called upon to give some account of the French preparations for the Transit of Venus. The French Government will occupy five stations, and will make use of the Daguerreotype in preference to the collodion process. Their photographs will be taken in the principal focus of the instruments, and the image of the sun will thus be only about 36 millimètres in diameter. The trial photographs are so sharp that they hope to be able to make use of magnifying power of 250 in measuring the photographs for the purposes of reduction. Lord Lindsay described the results of his experiments in photographing the appearance which is known as the black drop,—and Mr. Ranyard described some experiments which he had made as to the production of the black drop when viewed by the naked eye and through lenses. The President announced to the Society that a petition was about to be presented to the Dean of Westminster, praying him to admit of the erection of some memorial to Jeremiah Horrocks in Westminster Abbey. It was announced that the next meeting of the Society would be held in their new rooms in Burlington House.

AN ANCIENT CHINESE CAPITAL.

At a meeting of the members of the Asiatic Society held on June 22nd, at which J. Fergusson, Esq., vice-president, in the chair, an interesting paper, by Dr. S. W. Bushell, "On the old Mongolian Capital of Shangtu," was read. This city was founded in A.D. 1526, when the Emperor Hein Tsung ordered his brother (a successor) to occupy the territory and to form a military encampment there. In 1268 Shangtu was made the seat of a governor-general. It is situated twenty-seven miles north-west of Dolonnor, which Abbé Huc wrongly supposed to have been built on the site of the ancient city. After the fall of the Yuan dynasty it rapidly diminished in importance, and was finally abandoned by the Chinese in A.D. 1430. The ruins were visited by Dr. Bushell and the Hon. T. G. Grosvenor on September 16, 1872. The walls, built of earth, faced with unhewn stone or brick, are still standing, though more or less dilapidated. They form a double enceinte, the outer with six, the inner with three gates, one of which, a perfect arch, 29 feet by 12 feet wide, is still intact. The ground in the exterior of both inclosures is strewn with blocks of marble and other remains of large temples and palaces, broken lions, dragons, and remains of other carved monuments lying about in every direction. An inscription of the Yuan dynasty in an ancient form of the Chinese character has been copied by Dr. Bushell.

The Scientific and Literary Review

Is published at the

OFFICES, 21, COCKSPUR STREET, CHARING CROSS.
LONDON, S.W.,

On the 1st of every Month, and sent post free on prepayment of the ANNUAL SUBSCRIPTION OF 6s. 6d.; or it may be had by order, from MESSRS. KENT AND CO., PATERNOSTER ROW or any Bookseller or Newsagent in the kingdom, price 6d per copy.

The SCIENTIFIC REVIEW, being well read by Manufacturers and Capitalists interested in inventions and enterprises for the promotion of industry, will be found a desirable medium to many Advertisers.

To Correspondents:—SCIENTIFIC COMMUNICATIONS AND BOOKS FOR REVIEW to be addressed to the Editor at this office; as also letters respecting ADVERTISEMENTS, SUBSCRIPTIONS, &c.—Correspondents are desired to keep copies of their communications, as the Editor cannot undertake to return them.

Editor's Office: 21, Cockspur Street, Charing Cross, S.W.

THE INVENTORS' INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE, LONDON
ESTABLISHED 1ST MAY, 1862.

Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President of Council:

SIR ANTONIO BRADY.

TO MEMBERS OF COUNCIL.

Council Meetings on Thursdays, August 13th (monthly special) and 27th. Executive meetings at the same time.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts. F. W. CAMPIN, Sec.

Proceedings of the Institute.

At the meeting of the Council (ordinary and special) held on 18th June, 1874, F. H. Varley, Esq., Vice-President of the Council, in the chair, the minutes of the last meeting having been read and passed, a letter from the Right Hon. B. Disraeli, Prime Minister, was read, declining to receive a deputation on the Patent Laws, but requesting communications from the Institute thereon; and after some discussion this was ordered to stand over for further consideration, and thereupon the Council adjourned till Thursday, 25th June.

At the adjourned Council after much consideration it was decided that the subject must stand over for the present.

At the meeting of the Council (monthly special) the minutes were passed, and the following new members recorded, viz., Messrs. Kirkwood, Dix, and Newton; at the same time the executive (or Executive Committee) met and discussed some business arrangements relative to the Journal of the Institute.

Monthly Notices.

A statue of Wilson, the ornithologist, will, in a few weeks, be erected within the burying-ground of the abbey of Paisley, and within a few minutes' walk of the spot where he was born.

The French Academy of Sciences elected, at the Séance of the 8th of June, two correspondents, M. Tholozan, physician to the Shah of Persia, in the section of Medicine,—and M. Studer, in the section of Mineralogy and Geology.

The Reports and Proceedings of the Miners' Association of Cornwall and Devon for the year 1873 have just been issued. Some papers of considerable interest, especially in relation to mineral lodes, will be found in this volume, especially "Remarks on Two Cross-Sections through Carn Brea Hill and Neighbouring Mines," by Capt. J. Maynard; and "Observations on the Elvan Courses, Greenstones and Sandstones of Cornwall, with Remarks on their Associated Minerals," by Mr. A. K. Barnett. These papers are well illustrated, and have a practical and scientific value.

"The Successor of Steam" is the title of a brief paper which has appeared in the *Isis*, a physical journal published at Haarlem, in which Dr. H. Beins, of Groningen, advocates the employment "in our common steam and other engines," of liquid carbonic acid, prepared, as he states, cheaply, from "natrium bicarbonate."

Les Mondes states that M. Francois Désiré Roulin, well-known in connection with the Natural History of Equatorial America, died on the 4th of June last, at the age of seventy-eight.

Platinized Iridium, on being prepared for the International Metrical Commission, at each stroke of the hammer there were produced luminous lines, crossing each other at right angles, passing from one side of the bar to the other. M. Tresca has called attention to this curious phenomenon, which he does not attempt to explain.

Steam, as a fire-extinguisher, has been employed with remarkable effect in the Hidden and Cope Mine, the workings of which are more than 600 feet below the surface. Mr. Henry Coryell has recently read a paper on this before the American Society of Civil Engineers.

The capacity of an electrical condenser was found by Faraday, many years ago, to depend, not only on the form and distance of the metal plates, but also on the character of the intervening insulator. Some experiments have been performed by Herr Boltzmann, of Vienna, with the view of determining the dielectric constants of different insulating media. His results have been communicated to the Vienna Academy of Sciences, and are published in the last number of Poggendorff's *Annalen*.

Osmiridium, that rare mineral, an alloy of the two metals osmium and iridium, has, says the *Athenaeum*, been discovered in Gippsland, in the Colony of Victoria. We hear also of valuable deposits of cinnabar having been found in Queensland. As quicksilver is largely employed in the amalgamation of gold-ores, it would obviously be a great gain to the Australian miner to be independent of foreign supplies of this expensive metal.

Mr. Mallet's theory of vulcanicity is attracting much attention, and giving rise to considerable discussion. Prof. E. W. Hilgard, of the University of Michigan, presented to the National Academy of Sciences a memoir on some of the points in this theory. Assuming that Mr. Mallet's hypothesis accounts satisfactorily for earthquake phenomena and volcanic activity, as manifested since the cessation of fissure eruptions; and also for the gradual or sudden depression of both large and small areas, even subsequent to that time, Prof. Hilgard contends that it makes no provision for their elevation, and, therefore, leaves unexplained the numerous oscillations of level, of which we find the record in nature down to our own time.

Lord Roseberry will preside over the meeting at Glasgow of the Social Science Congress, and will deliver an Inaugural Address. Sir George Campbell will preside over the Department of Economy and Trade.

Dr. J. E. Gray has been elected a Foreign Member of the Royal Society of Science and Art at Gottenburg, in Sweden.

The American Association for the Advancement of Science holds its twenty-third meeting at Hartford, Connecticut, on Wednesday, the 12th of August, Dr. Le Conte being the President for the year, and Mr. F. W. Putnam, of Salem, Massachusetts, the permanent Secretary.

Proceedings of Societies.

ROYAL SOCIETY.

JUNE 18TH.—The President in the chair.—The following papers were read:—"On the Anatomy of the Lymphatic System," by Dr. G. Thin; "Experiments with Safety Lamps," by Mr. W. Galloway; "A Contribution to the Histology of the Blood," by Dr. W. Osler; "On Coniferine, and its Conversion into the Aromatic Principle of Vanilla," by Messrs. F. Tiemann and W. Haarman; "Researches in Spectrum Analysis in connection with the Spectrum of the Sun, No. IV.," by Mr. J. N. Lockyer; "Tables of Temperatures of the Sea at different Depths beneath the Surface, reduced and collated from the various Observations made between the Years 1772 and 1868, with Notes and Sections," by Mr. J. Prestwich; "On the Forces caused by Evaporation from and Condensation at a Surface," by Prof. O. Reynolds; "Given the Number of Figures not exceeding 100 in the Reciprocal of a Prime Number, to determine the Prime itself," and "On the Number of Figures in the Reciprocal of every Prime Number from 20,000 to 30,000," by Mr. W. Shanks; "Researches on Explosives: Fired Gunpowder," by Capt. Noble and Mr. F. A. Abel; "On the Centre of Motion in the Human Eyes," by Mr. J. L. Tupper; "On the Mechanism of Stromboli," by Mr. R. Mallet; "On the Employment of a Planimeter to obtain Mean Values from the Traces of continually Self-recording Meteorological Instruments," by Mr. R. H. Scott; "On Dredgings and Deep-Sea Soundings in the South Atlantic, in a Letter to Admiral Richards," by Dr. W. Thomson; "On the Diuretic Action of Digitalis," by Drs. Brunton and Power; "Description of the Living and Extinct Races of Gigantic Land Tortoises, Parts I. and II., Introduction, and the Tortoises of the Galapagos Islands," by Dr. Günther; "On the Adiabatics and Isothermals of Water," by Mr. A. W. Rücker; "Research on the Smallpox of Sheep," by Dr. Klein; "On the Physiological Action of the Chino line and Pyridine Bases," by Messrs. J. G. McKendrick and J. Dewar; "On the Sun-spot Period and the Rainfall," by Mr. J. A. Broun; "Some Observations on Sea-Water Ice," by Mr. J. Y. Buchanan; "Contributions to Terrestrial Magnetism, No. XIV.," by Sir E. Sabine; "On the Calculus of Factorials," by the Rev. Dr. Logan; and "Magnetic Observations at Zi-ka-Wei," by the Rev. S. J. Perry. The society adjourned for the long vacation.

ROYAL INSTITUTION.

JULY 6TH.—The Earl of Rosse, V.P., in the chair.—Messrs. W. W. Brodcklehurst, B. Dietz, W. T. Hustwitt, F. P. Leon, W. Reade, and Dr. C. D. F. Phillips were elected Members.

GEOGRAPHICAL SOCIETY.

JUNE 22ND.—Anniversary Meeting.—The Right Hon. Sir H. Bartle Frere, K.C.B., President, in the chair. The Founder's Gold Medal, for the encouragement of geographical science and discovery, was presented to Dr. Schweinfurth, for his explorations in Central Africa, his discovery of the Uelle River, beyond the south-western limits of the Nile basin, and for his admirable work, "The Heart of Africa," in which he has recorded the results of his travels. The Victoria or Patron's Medal was awarded to Colonel P. Egerton Warburton, for his journey across the previously unknown western interior of Australia, from Alice Springs, on the line of overland telegraph, to the western coast, near De Grey River. The prizes to public schools for 1874, were as follow:—Physical Geography—Gold Medal, L. Weston (City of London School); Bronze Medal, F. C. Montague (University College School). Political Geography—Gold Medal, W. H. Turton (Clifton College, Bristol); Bronze

Medal, L. Jacob (City of London School). It was announced that the special subject for the examination in 1875, both in Physical and Political Geography, would be China. The following gentlemen were elected as council and officers for 1874-5:—President, Major-General Sir H. C. Rawlinson; Vice-Presidents, Sir R. Alcock, Admiral Sir G. Back, Admiral R. Collinson, and the Right Hon. Sir H. Bartle Frere; Trustees, Lord Houghton and Sir W. C. Trevelyan, Bart.; Secretaries, C. R. Markham and R. H. Major; Foreign Secretary, Lord A. Russell, M.P.; Councillors, Sir S. W. Baker, Hon. G. C. Brodrick, Sir G. Campbell, Lord Cottesloe, Captain F. J. O. Evans, A. G. Findlay, J. Fergusson, Admiral Sir W. H. Hall, Major-General Sir F. J. Goldsmid, M. E. Grant-Duff, M.P., Colonel J. A. Grant, J. Murray, Sir C. Nicholson, Bart., Admiral E. Ommanney, General C. P. Rigby, Marquis of Lorne, H. D. Seymour, S. W. Silver, W. Smyth, Sir H. C. Verney, Bart., and Major C. W. Wilson; Treasurer, R. T. Cocks.

ASIATIC SOCIETY.

JUNE 22ND.—J. Fergusson Esq., V.P., in the chair.—Sir G. Campbell, Col. H. L. Thuillier, and Capt. H. F. Blair were elected Members. A paper by Mr. Henry H. Howorth, "On the Origin of the Manchus," was also read. Starting from various etymologies assigned to the word Manchu by several scholars, the writer examined the legendary accounts of the Manchus regarding their origin, and traced their history from the earliest times down to the death of Tai-tsu in A.D. 1625.

GEOLOGICAL SOCIETY.

JUNE 10TH.—J. Evans, Esq., President, in the chair.—Messrs H. Leonard, A. Dunlop, and J. Young, were elected Fellows.—The following communications were read:—"On the occurrence of Thanet-Beds and of Crag at Sudbury, Suffolk," by Mr. W. Whitaker. "Notes on the Phenomena of the Quarternary Period in the Isle of Portland and around Weymouth," by Mr. J. Prestwich. "On the Character of the Diamantiferous Rock of South Africa," by Prof. N. S. Maskelyne and Dr. Flight. "Note on a modified Form of *Dinosaurian ilium*, hitherto reputed Scapula, indicative of a new Genus, or possibly of a new order of Reptiles," by Mr. J. W. Hulke; and "Note on a Reptilian Tibia and Humerus (probably of Hylæosaurus), from the Wealden Formation in the Isle of Wight," by Mr. J. W. Hulke.

CHEMICAL SOCIETY.

JUNE 18TH.—Prof. Frankland, V.P., in the chair.—The following papers and memoirs were read:—"On the Action of Chlorine, Bromine, &c., on Isodinaphthyl," by Mr. W. Smith, Communications from the Laboratory of the London Institution: No. XIII., "On Coal-Tar Cresol, and some Derivatives of Paracresol," by Dr. H. E. Armstrong and Mr. C. L. Field; No. XIV., "On the Action of the Chlorides of the Acids of the Sulphur Series on Organic Compounds," by Dr. H. E. Armstrong and Mr. W. H. Pike; No. XV., "On Chloro-bromo and Iodo-nitro Phenol-parasulphonic Acids," by Dr. H. E. Armstrong and Mr. F. D. Brown; and No. XVI., "Note on the Decomposition of Dichloronitrophenol by Heat," by Dr. H. E. Armstrong and Mr. F. D. Brown.—"On the Products of the Decomposition of Castor Oil, No. III., on Decomposition by Excess of Alkaline Hydrate," by Mr. E. Meison. The author said he had succeeded in elucidating the conflicting statements of the different chemists on this subject. "On Hydrogen Persulphide," by Dr. W. Ramsay, "Suberone," by Dr. C. Schorlemmer and Mr. R. S. Dale, "On the Action of Nitrosyl Chloride on Organic Bodies, Part I., on Phenol," by Dr. W. A. Tilden, "An Apparatus for Determining the Moisture and Carbonic Anhydride in the Atmosphere," "A Method for Determining Ozone in the Presence of Chlorine

and Nitric Oxide," and "On the Constitution of Urea," by Dr. D. Tommasi, "On the Restitution of Burnt Steel," by Mr. S. L. Davis, "On the Action of Earth on Organic Nitrogen," by Mr. E. C. Stanford, "Aniline and its Homologues in Coal-Tar Oils," by Mr. W. Smith.

METEOROLOGICAL SOCIETY.

JUNE 17TH.—Dr. R. J. Mann, President in the chair.—Messrs. R. Bushell, T. Crawford, G. Gardiner, R. Smith, J. H. Steward, and E. Twenlow were elected fellows; Prof. Buys Ballot, Herr W. H. von Freeden, Dr. C. Jelinek, G. T. Kingston, M.A., Dr. J. von Lamont, Prof. E. Loomis, Dr. H. Mohn, Dr. G. Neumayer, Dr. E. Plantamour, M. C. Sainte-Claire-Deville, Padre A. Secchi, and Dr. H. Wild, were elected honorary Members.—"On the Connexion between Colliery Explosions and Weather in the Year 1872," by Messrs. R. H. Scott and W. Galloway. The paper is in continuation of those by the same authors read before the Royal Society in 1872, and before the Meteorological Society in 1873, which contained the results for the four preceding years. The number of fatal explosions which occurred during the year was seventy, causing the loss of 163 lives. Three of these killed, each of them, more than ten men, being the same as the average number of serious explosions for the last twenty years. The number of non-fatal explosions was 224. A comparison of the dates of all recorded explosions with the curves of the barometer and thermometer kept at Stonyhurst for the Meteorological Office leads to the following result: 58 per cent. of the explosions are due to changes of pressure, 17 per cent. to great heat of the weather, while 25 per cent. are not attributed by the authors to meteorological agencies. These proportions are nearly the same as those which have come out from the discussions of similar facts for previous years. The next question touched upon was the alleged greater prevalence of explosions with certain winds, and it was shown that the ordinary changes of pressure and temperature in the windrose were hardly sufficient to account for the explosions which are found to accompany sudden changes of weather. The paper also discussed a diagram exhibiting the continuous curve of barometrical pressure from the Glasgow Observatory for the last nine months of 1873, and a curve showing the prevalence of fire-damp in the mines of the West of Scotland district for the period. The books of thirty-five mines about Glasgow have been used for the comparison. The two curves show a remarkable accordance in their course. The result shows that the escape of fire-damp is related mainly to the conditions of atmospheric pressure, and that a careful watch over the barometer is, above all, necessary in each colliery, though one such record would suffice for several adjacent mines.—"Solar Radiation, 1869-74," by the Rev. F. W. Stow, M.A.—"The Diurnal Inequalities of the Barometer and Thermometer, as illustrated by the Synchronous Observations made during May, 1872, at the Summit and Base of Mount Washington, New Hampshire, at the respective Heights of 2,615 and 6,283 feet above the Sea Level," by Mr. W. W. Rundell. The hourly mean differences of pressure and temperature at these stations and at Portland, Maine, the nearest U.S. station to Mount Washington, were discussed, and their most probable coefficients were determined, also the times at which their maxima and minima occur. Upward and downward currents of air and vapour produced each day by the action of the sun, joined to the evaporation and condensation of moisture, and the absorption and liberation of heat, were suggested as sufficient to explain the phenomena, without recourse to the unsupported hypothesis of an overflow of air at the top of the atmosphere, and an inward current of air at the

earth's surface. Observations obtained by means of captive balloons fitted with automatic apparatus for recording the details of an observatory below them were suggested as likely to afford more satisfactory data for the solution of this problem, and as being free from some of the objections which necessarily belong to mountain observations.—"On the Diurnal Variation of the Barometer at Zi-Ka-Wei, and mean Atmospheric Pressure and Temperature at Shanghai," by the Rev. A. M. Colombel, M.A.—"Weather Report for 1873, at Woosung, China," by Mr. C. D. Braysher.—"Note regarding a remarkable Hailstorm at Pietermaritzburg, Natal, on April 17th, 1874," by the Rev. J. D. La Touche.

STATISTICAL SOCIETY.

JUNE 30TH.—Anniversary Meeting.—The following Fellows were elected as President, Council, and Officers for the year ensuing: President, W. A. Guy; Council, Earl of Airlie, Sir J. Anderson, General Sir G. Balfour, H. G. Bohn, T. Brassey, S. Brown, E. Chadwick, H. Chubb, Hyde Clarke, L. H. Courtney, F. Galton, R. Giffen, F. H. Janson, H. Jeula, J. T. Hammick, F. Hendrick, J. Heywood, F. Jourdan, H. R. Lack, Prof. Leone Levi, W. G. Lumley, R. B. Martin, Dr. F. J. Mouat, R. H. Patterson, F. Purdy, E. Seyd, T. Sopwith, Earl Stanhope, General R. Strachey, and W. Tayler; Treasurer, J. T. Hammick; Secretaries, Dr. F. J. Mouat, R. Giffen, and H. R. Lack; Foreign Secretary, Dr. F. J. Mouat.

LINNEAN SOCIETY.

JUNE 19TH.—Dr. G. J. Allman, President, in the chair.—Mr. E. Birchall, Dr. J. Leatham, and Mr. J. H. Lewis were elected Fellows.—Mr. D. Hanbury exhibited branches of olive in flower grown in the open air, and a specimen of *Rheum officinale*, the true officinal rhubarb.—Dr. Hooker made a communication on the subject of some Indian Garcinias.—Prof. Thistleton-Dyer exhibited a young oak-plant with three cotyledons.—Mr. A. W. Bennett exhibited drawings of the style, stigma, and pollen-grain of *Pringlea antiscorbutica*, illustrating its provisions for wind fertilization.—The following papers were read: "On the Resemblances between the Bones of Typical Living Reptiles and the Bones of other Animals," by Mr. H. G. Seeley.—"On the Auxemnee, a new Tribe of Cordiaceae," by Mr. J. Miers.—A Revision of the Sub-order Mimoseae, by Mr. G. Bentham.—"On some Fungi collected by Dr. S. Kurz in Yomah, Pegu," by Mr. T. Currey,—and "Notes on the Letters from Danish and Norwegian Naturalists contained in the Linnean Correspondence," by Prof. J. C. Schiodte, Copenhagen.

ANTHROPOLOGICAL INSTITUTE.

JUNE 23RD.—Prof. Busk, President, in the chair.—Mr. R. G. Haliburton was elected a member. Mr. R. Dunn read a paper "On Ethnic Psychology." The author dwelt on the importance of carefully studying the cerebral organization of the typical races as the only way of elucidating the psychological differences which exist among them. Notwithstanding the labours of Gratiolet in that field of inquiry, a vast deal remained to be done. A paper by Mr. R. Pennington was read "On the Relative Ages of Cremation and Contracted Burial in Derbyshire in the Neolithic and Bronze Ages." The object of the paper was to show that the impression that stone implements and contracted burial bronze implements and cremation, are usually associated is quite erroneous, as tested by the results of barrow-opening in the Peak of Derbyshire. The researches of Messrs. Bateman and Carrington, on being tabulated, proved that. Of "finds" containing stone implements, 65 per cent. were cases of contracted burial, 34 per cent. were burnt. In the bronze, 58 per cent.

were contracted, 38 per cent. were burnt. It was clear that those who deposited stone implements in the graves of their dead, and those who placed there articles of bronze, shared pretty equally the differences of custom in the interment of the body. So that out of 150 contracted interments, 50 per cent. were accompanied by stone only, 12 per cent. bronze; and out of 86 burnt cases, 46 per cent. afforded stone only, and 14 per cent. bronze. The conclusion was fully borne out by examination of the contents of each tumulus. Several instances were given as showing that the Neolithic and Bronze peoples alike used both modes of burial. If bronze was introduced by invaders, the aborigines must have held their own in the Peak mountains, and the Bronze and Neolithic peoples must there have intermingled both their blood and their customs. A paper, by Miss A. W. Buckland, was read, "On Mythological Birds Ethnologically Considered." The paper commenced by indicating the process by which savage tribes in the stage of totemism afterwards exalted their tribal totems into gods, and went on to show that that early phase of religion could be clearly traced in ancient Egypt. Many legends from various countries were quoted to prove that birds were especially regarded as the abodes of departed spirits. The chief object of the author was to prove that, in tracing the bird-legends to their sources, valuable ethnological result might be obtained, and a clue afforded to the migrations of man in pre-historic times. The President took the opportunity, on the last ordinary meeting of the session, of announcing that the appeal of the council of the members at the anniversary had been so successful that the institute was now free from debt.

July 1st.—Special Meeting.—Prof. Busk, President, in the chair.—Mr. J. Cunningham was elected a Member.—Col. Lane Fox read a paper "On the Principles of Classification adopted in the Arrangement of his Anthropological Collection exhibited in the East London Museum." The paper contained three divisions, viz., Psychological, Ethnological, and Pre-historic.

APPLICATIONS FOR LETTERS PATENT.

(Continued from page 110.)

railway carriages.—W. R. Lake. Improved inhaling apparatus (com.)—F. Wigg. Treating and preparing granular or finely divided ores for smelting.—C. H. Southall. Finishing the edges of the soles and heels of boots and shoes.—B. T. Newnham. Landaus or such like carriages.—J. W. Gibson, J. P. Kennedy, and A. Prior. Manufacture of tobacco and oil and apparatus employed therein.—P. M. Shanks. Production of raised surfaces or blocks for printing and the preparation of materials and the construction of apparatus employed therein (partly com.)—J. T. McNally. Means for separating flour or meal from bran and other foreign matter.—J. H. Johnson. Spark arresters (com.)—A. Browne. Tongs for serving salad, asparagus, and other edibles (com.)—J. Vasseur. Projectiles for ordnance.—R. D. Sanders. Construction and working of signals and breaks on railway trains, locking and unlocking the doors of railway carriages, and economizing fuel in locomotive engines.—T. L. Joyce. Mode of and apparatus for effecting a reduction of temperature applicable to the generation of motive-power, and to the manufacture of ice (com.)—C. Muratori. Manufacture of artificial leather.—J. G. Tongue. Means employed for transmitting motion on railways (com.)—Sir F. C. Knowles, Bart. Means and method of preventing decay of wood and other ligneous fibres.

On May 1st.—1527 to 1547.—T. B. Bishop. Sewing machines and attachments therefor (partly com.)—A. M. Fowler and R. Husband. Construction of privies and water-closets.—W. McAdam. Utilising waste products of chemical works for constructing bricks or blocks for building or analogous structural purposes.—G. J. Brine and T. Allen. Cisterns or cistern ap-

paratus for discharging or flushing at intervals, and preventing waste of water.—K. L. H. Gereke. Apparatus for regulating and measuring the flow of gas or other fluids (com.)—F. Wright. Apparatus for stoppering bottles for containing gaseous and aerated liquids.—L. J. Todd. Tramway locomotives, and in cars for the same.—W. H. M. Blews. Purifying the quinoidine of commerce (com.)—J. W. Broadbent. Apparatus for heating the feed water of the boilers of locomotive engines.—I. Bradley. Solid flanged metallic cartridge cases (com.)—G. F. Bruce and R. Steers. Screws and screw-drivers.—W. Bull. Flame kilns or ovens for baking or burning bricks or other goods, by means of continuous firing.—A. M. Clark. Looms for waving (com.)—G. Westinghouse, jun. Apparatus for working brakes and communicating signals on railway trains.—J. Payne and J. W. Freestone. Night lights.—J. H. Johnson. Looms (com.)—H. B. Walshe. Apparatus for withdrawing beer or other liquids from casks or other vessels.—G. A. Crow. Machines and tools for shaping metals.—J. Stone. Manufacture of wrought iron, and furnaces and apparatus employed therein.—M. Hymann. Portable book-holder.—Sir F. C. Knowles, Bart. Preparation of peat for fuel, and appliances or apparatus for the purpose.

On May 2nd.—1548 to 1559.—W. Webster. Manufacture of balls to be used in the game of croquet or other games.—T. E. Collett. Methods of constructing buildings, warehouses, and dwelling-houses to render them waterproof. Sir F. C. Knowles, Bart. Manufacture of gas for heating purposes.—A. Chamberlain and J. Smith. Manufacture of pattern or moulding plates used in making moulds for casting metals.—J. Challis. Machinery for thinning and hoeing turnips.—J. H. Radcliffe. Valve oil cans and machine for manufacturing them, which is applicable to cutting out of other cone tin or sheet-iron vessels.—H. Wilde. Machinery and apparatus for excavating coal and other minerals, and the mode of actuating such machinery.—W. R. Lake. Anchors (com.)—W. R. Lake. Label or ticket for the manufacturers of cloth or clothing (com.)—E. Walker. Machinery for damping paper for printing purposes.—S. H. Daddow. Squibs, fuses, and matches for mining and blasting purposes. (Complete specification).—A. M. Clark. Apparatus for grappling submerged objects and taking soundings (com.)

On May 4th.—1560 to 1576.—W. A. Lytle. Process and apparatus for smelting iron.—H. A. Bonneville. Apparatus for drying up bagasse and other materials (com.)—C. Brock. Process of decorating pottery and other fictile manufactures.—J. Ward. Machinery for drawing and spinning cotton.—W. R. Lake. Syrup jug or pitcher (com.)—R. Gotthell. Heated air motors (com.)—R. Gotthell. Explosive compound for blasting purposes (com.)—R. M. Lowne. Anemometers and other fluid metres.—W. Pinkerton. Apparatus for communicating or signalling between parts of railway trains.—W. Lancaster and E. Dollander. Construction of apparatus for sizing and dressing yarns, part of which is also applicable for starching and drying woven goods.—T. Skinner. Mode or process of etching on steel or iron or other metal or substance.—H. Phillips. Marine engine governors or speed-governing and regulating apparatus for the motors of steam ships and such like purposes.—H. Cherry. Condensers for steam pumping engines.—W. Mort. Preservation of food and other perishable substances (com.)—B. Brown. Boilers for treating fibrous substances for the manufacture of paper.—W. Taylor. Sewing machines and shuttles for the same (partly com.)—T. J. Smith. Manufacture of lace (com.)

On May 5th.—1577 to 1589.—W. Elsam. Eyelet (com.)—H. Willock. Button.—W. E. Gedge. Traction engine or mechanical horse, which may also be used for working fixed or portable machines (com.)—W. I. Clayton. Fire escapes.—W. Knowles. Shake willy.—T. O. Jones. Manufacture of crystal handles and tops for umbrellas, sun-shades, and walking sticks, also applicable to riding whips.—T. Jackson. Recovery of sulphuric acid when combined with certain chemical products.—W. T. Sugg. Apparatus for regulating the supply of gas.—B. Looker. Heating apparatus.—D. Spill. Machinery or apparatus for propelling tramway cars and other vehicles upon rails and common roads or both alternately, also applicable for propelling boats and other floating

vessels.—J. H. Johnson. Apparatus for indicating and registering or recording variations in pressure, weight, and temperature (com.)—R. H. Cowins. Railway signalling apparatus.—F. Lenoir. Apparatus for carburetting gas.

On May 6th.—1590 to 1603.—J. B. Hamilton. Construction of musical instruments.—J. Jackson. Lubricant to be used in the preparing wool.—E. Priestman. Machinery for combing wool and other fibres.—H. Sawyer. Extension tables (com.)—F. Curtis. Manufacture of agricultural and other implements (com.)—A. Ara and M. Del-Bubba. Composition for preserving metals from oxidation.—J. Thornton and W. D. Thornton. Apparatus for dyeing in sections fibrous materials or striped goods.—E. G. Brewer. Looms for weaving and particularly the jacquard mechanism (com.)—S. Stead. Means for preventing rust or corrosion of iron and other metals.—T. H. Rushton. Machinery for preparing cotton and other fibres.—W. Gil.—J. H. Ivory. Horse-shoes.—A. James. Needles (com.)—J. Booth. Heating vertical steam engine boilers.—T. Oldham. Stopping bottles.—J. McKay. Drilling apparatus.—J. C. Mewburn. Machinery for cleaning yarns (com.)—J. G. Tongue. Lining for horse collars, saddles, and other parts of harness (com.)—W. R. Lake. Steam boilers and furnaces, and apparatus connected therewith (com.)—C. Riches. Machines or apparatus for grinding and sharpening knives or cutters of reaping and mowing machines and other knives, cutters, tools, or instruments, being also applicable for various motive purposes.—W. Mitchell. Apparatus for elevating agricultural and other produce, applicable also for shooting and filling sacks and for other purposes.

On April 16th.—1303 to 1323.—J. Houghton, T. Thompson, and S. Peil. Horse rakes.—J. Laird, jun., and W. Rutherford. Weaving bags, sacks, and tubular fabrics, and the adaptation or arrangement of mechanism employed therefor.—A. Dawson. Ornamenting work lace.—W. Hood. Telegraph and signal posts, pilasters, boundary posts, mile posts, and standards for the support of machinery or other matters.—C. W. Siemens. Method of trans-

mitting telegraphic signals by submarine or other insulated electric conductors and apparatus for that purpose (com.)—R. Gottheil. Apparatus. Marine and other engine governors, which are especially adapted to high and low pressure combined engines.—A. V. Newton. Preparation of caustic alkali packages (com.)—D. Fisher. Meters for measuring water and other fluids.—W. Manson. Reciprocating pistons by atmospheric pressure, obtained by the action of a piston in a separate cylinder, by which the air in said cylinder is forced alternately above and below the working piston, said improvement being applicable for driving hammers, stamps, drills, and other percussive machinery. (Complete specification).

M. A. de Candolle was elected at a recent meeting of the Académie des Sciences as "un Associé Etranger," to replace the late Prof. Agassiz.

Mr. R. W. Atkinson, B.Sc., has been appointed Professor of Chemistry in the Imperial College at Yeddo. Mr. Atkinson was formerly a student at the Royal School of Mines, and has for some time past been assistant to Prof. Williamson, at University College.

TO CAPITALISTS.—WANTED, from £1,000 to £2,000 to extend a business for the sale of a patented article of great demand, which has been working successfully for over two years. Liberal interest or participation in profits will be given. Address, F. case of Mr. C. Graham Carttar, public accountant, 11, Clement's Inn, Strand, W.C.

TO CAPITALISTS AND OTHERS.
BLAKE'S PATENT FIRE ALARM.—
THE SOLE LICENSE TO WORK the above Patent is for DISPOSAL.

Terms: Royalty and small premium.
For particulars apply Inventors' Patent Right Association (Limited), 21, Cockspur-street, Charing-cross. For description see paper read before Inventors' Institute, published in the SCIENTIFIC AND LITERARY REVIEW, March 1st, 1874; "English Mechanic," July 18, 1873; "The Engineering and Building Times," July 14, 1873. For account of experiments at the Crystal Palace see "Standard," October 31st, 1873; "Court Journal," November 8th, 1873, &c.

SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE.

MANUALS OF ELEMENTARY SCIENCE.

PRICE ONE SHILLING EACH.

Foolscap 8vo. Limp Cloth. Each Volume containing 128 pages, with Illustrations.

NOW READY.

PHYSIOLOGY.—By F. le Gros Clark, Esq., of St. Thomas's Hospital.

GEOLOGY.—By the Rev. T. G. Bonney, M.A., F.G.S., &c., Fellow and Tutor of St. John's College, Cambridge.

IN PREPARATION.

CHEMISTRY.—By Albert J. Bernays. Professor of Chemistry, of St. Thomas's Hospital.

ZOOLOGY.—By A. Newton, M.A., Magdalen College, Cambridge, University Professor of Zoology and Comparative Anatomy.

MINERALOGY.—By H. Wyndham, M.A., Merton College, Oxford.

BOTANY.—By A. Bentley, Professor of Botany of King's College, London.

PHYSICS.—By J. Clerk Maxwell, M.A., Trinity College Cambridge, University Professor of Experimental Physics.

ASTRONOMY.—By W. H. Christie, M.A., Trinity College, Cambridge, of the Royal Observatory, Greenwich.

London:

77, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, W.C.; 4, ROYAL EXCHANGE, E.C.; AND 48, PICCADILLY, W.

In 8vo, with 12 Plates, price 21s. cloth,

THE OCEAN; its Tides and Currents and their Causes. By WILLIAM LEIGHTON JORDAN, F.R.G.S.

"A very valuable addition to the list of works advancing our cosmical knowledge."—SCIENTIFIC REVIEW.

"The Author of this book gives us a new Principia. Still, the book is the production of a man thoroughly well up in his own subject and many others collateral with it. It is one that may be safely commended to the study of all who are interested in the subject of ocean currents."—IRON.

"Here we have the vulnerable point of Dr. CARPENTER's modified resuscitation of the old theory of oceanic circulation clearly indicated, and a home-thrust of clear, sound reasoning fairly delivered

London: LONGMANS, GREEN, & Co., Paternoster Row.

through it. As this point is the very heart of Dr. CARPENTER's contribution to the subject, the thrust is fatal. It is followed by further and equally clear and able discussion of the details of Dr. CARPENTER's arguments, and of the theories of MAURY, BENNELL, HERSCHEL, &c. This Chapter XX. of Mr. JORDAN's book is really excellent, and worthy of careful reading."—QUARTERLY JOURNAL OF SCIENCE.

The reports received from H.M.S. "Challenger" are confirming the views expressed in this work with a distinctness exceeding the most sanguine anticipations of the Author.



MOSCOW.

Two Gold Medals
THREE ROYAL WARRANTS.



PARIS.

NEVER BE WITHOUT

KEEN'S
MUSTARD

SOLD IN SQUARE CANISTERS,

COVERED WITH A RED AND YELLOW LABEL.

The Manufacturers publicly guarantee that all Canisters covered with their well-known Red and Yellow Labels contain nothing but the pure Flour of Mustard, of a quality calculated to maintain the reputation acquired by their firm during the past 130 years.

KEEN, ROBINSON, BELLVILLE, & CO.,

PURVEYORS TO H.M. THE QUEEN AND H.R.H. THE PRINCE OF WALES.

The above well-known Article can be obtained of most Family Grocers and Italian Warehousemen throughout the Kingdom.

MRS. SOMERVILLE'S MEMOIRS.

Third Thousand, with Portrait, crown 8vo, 12s.,
PERSONAL RECOLLECTIONS from EARLY LIFE to OLD AGE of MARY SOMERVILLE. With selections from her Correspondence.
 Edited by her Daughter, MARTHA SOMERVILLE.

"This is a charming book; the story of the life of a remarkable and beautiful character, told for the most part in the tranquil evening of her well-spent days, by herself, with short additions here and there by her daughter, to complete the narrative. Few readers will put this volume aside after, what must always be, a pleasant perusal of its pages, without feeling that it has imparted, by a mysterious sympathy, much of the goodness which is diffused throughout it."—**ATHENÆUM**

"Mrs. Somerville was in science what Madame de Staël was in literature; but she had a far more expansive and varying intellectual sympathy than Madame de Staël. She loved painting, and at one time studied and worked at the art with every promise of decided success. She delighted in literature of all kinds, and in music. She was an enthusiastic admirer of everything beautiful in nature as in art, and she maintained from first to last a keen sympathy in the political progress of all countries."—**DAILY NEWS.**

"Miss Somerville has done her part with excellent tact and judgment. The 'Recollections' are each amusing, picturesque, or instructive; and the letters introduced, whether written by Mrs. Somerville or to her by Herschel, Faraday, Humboldt, Brougham, &c., possess generally some interest apart from the writers' names. At the close of the volume we feel that we have had too few rather than too many of the relics of so rich a life. Her daughter, so far as her own share in the book is concerned, has written as little as it was possible to do while conveying the needful facts and stringing her beads into a chain."—**QUARTERLY REVIEW.**

WORKS BY MRS. SOMERVILLE.

MOLECULAR and MICROSCOPIC SCIENCES. With 180 Illustrations. 2 vols. Post 8vo, 21s.

"With what indefatigable industry and undagging powers of acquiring knowledge Mrs. Somerville worked is best shown in her carefully compiled work on 'Molecular and Microscopic Science.' It is without a parallel as the intellectual feat of anyone drawing close to the 90th year, and more especially of a woman."—**SATURDAY REVIEW.**

"A work in which is contained a résumé of the most interesting results of recent scientific investigation."—**NATURE.**

THE CONNECTION of the PHYSICAL SCIENCES. 9th Edition. Post 8vo, 6s.

"This generally exact and admirable treatise."—**HUMBOLDT.**

"Mrs. Somerville's 'Connection of the Physical Sciences,' published in 1834, and her 'Physical Geography,' in 1848, was the means of drawing attention to the results obtained through the labours of a host of explorers, voyagers, and scientific thinkers."—**SATURDAY REVIEW.**

PHYSICAL GEOGRAPHY. 6th Edition. Post 8vo, 9s.

"This work in numerous points comes into close contact with the subject of Humboldt's Kosmos, a formidable competition, but one out of which Mrs. Somerville often comes successfully."—**SIR HENRY HOLLAND.**

"Mrs. Somerville's 'Physical Geography' is the work she is most generally known by, and notwithstanding the numerous works on the same subject that have since appeared, it still holds its place as a first authority."—**NATURE.**

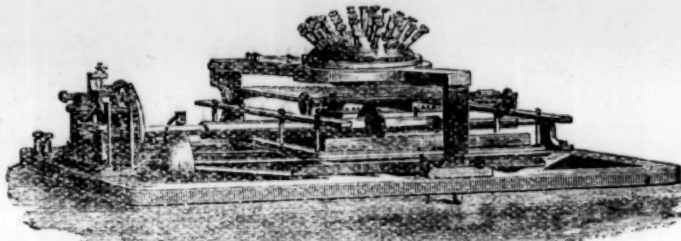
JOHN MURRAY, Albemarle-street.

NEW VOLUME. WEALE'S EDUCATIONAL SERIES.
 12mo, limp cloth, with numerous illustrations, price 2s.

A COURSE OF ANALYTICAL CHEMISTRY
 (Qualitative and Quantitative); to which is prefixed a Brief Treatise upon Modern Chemical Nomenclature and Notation.

By WILLIAM W. PINK, Practical Chemist and Metallurgical Analyst; and
 GEORGE E. WEBSTER, Lecturer on Metallurgy and the Applied Sciences, Nottingham.
 London: Lockwood and Co., 5, Stationers' Hall Court

BY HER MAJESTY'S ROYAL LETTERS PATENT.

**THE "WRITING BALL," OR ELECTRIC TYPE-WRITING APPARATUS**

Has been highly spoken of by "Telegraphic Journal," the "Engineer," the "Mechanic's Magazine," and several foreign papers; the KING OF DENMARK having shown the Inventor, the Rev. Malling Hansen, his appreciation of the invention by decorating him with the "GOLD MEDAL OF MERIT." The "Writing Ball" obtained A FIRST-CLASS MEDAL at the Copenhagen Exhibition of 1872, and the MEDAL FOR PROGRESS at the Vienna Universal Exhibition of 1873.

It enables the expert to write three or four times as fast as with pen and ink, the blind to write his own letters, him who has lost both arms still to write and do it fast; it allows of 10 copies being taken in one operation; it always writes distinctly and plainly. It is, therefore, of value in the Telegraph Service for copying messages, in large offices for correspondence, for copying shorthand notes, &c., &c.

An inspection is respectfully invited by

SOFUS E. HOLTEN, 82, GRACECHURCH STREET, LONDON, E.C.

Agent to the Proprietors of the British Patent;

and all particulars may be had of

MR. C. GRAHAM CARTTAR, Public Accountant, 14, CLEMENT'S INN, STRAND, W.C.

TO CAPITALISTS.

THE ADVERTISER solicits the Co-operation of Capitalists to join with him in carrying out the following Inventions:—

Improved Metallic Plates for plating the sides and bottoms of Ships and Vessels to prevent fouling and decay of the plates.

Improved Metallic Compositions for the sides and bottoms of Iron Ships and Vessels to protect the iron and prevent fouling.

Improvements in manufacturing Plates to be used for plating the outsides of Iron Ships.

Improvements in Armour Plates for War Ships, and in fixing same.

Improved Swinging Cabin or Cockpit for War or Merchant Ships.

Improved Swinging Cabin or Cockpit for War and Merchant Ships to carry Ordnance Guns, also applicable for floating Light-ships, Mariners' Compasses, or other thing required to be kept level.

A Mechanical Machine, being an economical substitute for Hydraulic Horse or limited Steam Power.

Improvements in Balloons or Machines to float in the air, and for propelling an navigating the same.

A Perpetual Self-acting Hydraulic Machine.

A Curb for runaway Horses.

Improved Trap for Drains.

Improved Iron Bridge or Viaduct.

Improved Fire Alarm and Fire Extinguisher.

SAMUEL CALLEY, 25, Leighton-grove, Kentish Town, N.W.

IMPORTANT INVENTIONS FOR SALE, DISPOSAL, OR LICENCE.**THE ATTENTION OF CAPITALISTS AND MANUFACTURERS**

Is solicited to the following list:—

PATENTS OPEN TO PARTNERSHIPS, SALE, OR LICENSE FOR IMPROVEMENTS IN

Bricks, and Roofing Tiles.
 Bottle Stoppers.
 Couplings, or Joint, for Hose, Water Pipes, &c.
 Saucepan Stirrer.
 Machine for Making Brushes.
 Tin-lined Lead Pipes.
 Traps for Preventing Escape of Foul Air.
 Diaries and Account Books.
 Life Boats.
 A Covering for Tramway Cars.
 Steam Ploughs, anchors for.
 Sewage Manure.
 Treating Skins and Furs.
 Earth Closets and Water Closets.
 Boilers for Steam Engines.
 Utilising Small Coal.
 Setting Boilers.
 Puddling Iron.
 Invalid Bedsteads.
 Fire Escape.
 Valve for Gas Pipes.
 Travelling Caps.

Hammock Beds.
 Locks.
 New Musical Instrument.
 Purification of Whiskey and other Spirits.
 Machine-made Wood Pavement.
 Heating and Hot Water Apparatus.
 Self-Cleansing Water Filters.
 Steam Ploughs.
 Cultivating Apparatus.
 Bottles for Port Wine.
 Stone-Crushing Machine.
 Cleansing Gas Retort Pipes.
 Preserved Coal.
 Safety Valves for Steam Boilers.
 New Motive Power.
 Speed Recorder.
 Air Beds.
 Animal Feeders.
 Potato Manures.
 Blind Rollers and Window-sash Fittings.
 Also valuable American, French, and other Foreign Patents.

FOR PARTICULARS AND TERMS APPLY TO—

MR. C. GRAHAM CARTTAR, PUBLIC ACCOUNTANT,
 14, CLEMENT'S INN, STRAND, W.C.

THE INVENTORS' INSTITUTE,

ESTABLISHED 1st MAY, 1862.

FORTNIGHTLY MEETINGS, DURING SESSION,

HELD AT
4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE.

PAST PRESIDENT—SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the Establishment of the INVENTORS' INSTITUTE till his decease, February, 1868.

PAST PRESIDENT—LORD RICHARD GROSVENOR, M.P., &c., from February, 1868, till May, 1871.

Council:

PRESIDENT OF COUNCIL,
SIR ANTONIO BRADY.

The Right Hon. The Earl of Caithness, Vice-Pres.
The Hon. Algernon Egerton, M.P., Vice-Pres.
Sir William Fairbairn, Bart., C.E., LL.D., F.R.S., Vice-Pres.
Lord Richard Grosvenor, M.P., Vice-Pres.
Beresford Hope, Esq., M.P., Vice-Pres.
General the Hon. James Lindsay, M.P., Vice-Pres.
His Grace the Duke of Manchester, Vice-Pres.
Robert Richardson, Esq., C.E., Vice-Pres.
Captain Jasper Selwyn, R.N., Vice-Pres.
Sir Fothergill Cooke, Vice-Pres.
Sampson Lloyd, Esq., M.P., Vice-Pres.

Cromwell F. Varley, Esq., F.R.S., &c., Vice-Pres.
Hume Williams, Esq., Vice-Pres. of Council.
F. H. Varley, Esq., Vice-Pres. of Council.
Alexander Allan, Esq., C.E.
P. W. Barlow, Esq., C.E., F.R.S.
W. H. Barlow, Esq., C.E., F.R.S.
Henry Bessemer, Esq.
M. P. W. Boulton, Esq.
Jacob Bright Browett, Esq.
Benjamin Burleigh, Esq., C.E.
F. W. Campin, Esq.
Samuel Chatwood, Esq.
D. K. Clarke, Esq., C.E.
Dr. Robert H. Collyer, F.C.S.
Samuel Courtauld, Esq.
H. C. Coulthard, Esq., C.E.
Dr. J. M. Croft.
Robert Davison, Esq., C.E.

William Dempsey, Esq., C.E.
W. Hempson Denham, Esq., M.D.
John Farmer, Esq.
J. Faulding, Esq., C.E.
H. A. Fletcher, Esq., C.E., F.R.A.S.
John Grantham, Esq., C.E.
Hugh Greaves, Esq., C.E.
Robert Griffiths, Esq.
M. M. Harris, Esq.
G. W. Hemans, Esq., C.E.
W. T. Henley, Esq.
Alexander Mitchell Innes, Esq.
W. Mitchell Innes, Esq.
Julius Jeffreys, Esq., F.R.S.
Dr. H. C. Jennings.
Dr. P. W. Latham, M.A.
Edward Lord, Esq.
D. J. McLauchlan, Esq.
Walter Macfarlane, Esq.
Colin Mather, Esq.

John Mackintosh, Esq.
W. W. Moore, Esq.
Thomas Morgan, Esq.
George Frederick Muntz, Esq.
A. J. Murray, Esq., C.E.
A. Normandy, Esq.
J. J. Parkes, Esq., C.E.
W. H. Preece, Esq., C.E.
T. W. Rammell, Esq.
John Ramsbottom, Esq., C.E.
Fred. Ransome, Esq., C.E.
John Saxby, Esq.
A. Sedley, Esq.
C. Williams Siemens, Esq., C.E. F.R.S.
E. Sonstadt, Esq.
Berger Spence, Esq.
Robert Wheble, Esq.
E. O. W. Whitehouse, Esq., C.E.
W. N. Wilson, Esq.
W. Yates, Esq.

Secretary.
F. W. CAMPIN, Esq.

Auditor.
G. GRAHAM CARTTAR, Esq.

Treasurer.
M. M. HARRIS, Esq.

The various efforts which have been made, and the numerous influences now at work to injure, if not destroy, Patent Rights; the inefficiency of the many well-intended, but ill considered, Schemes of Patent Law Reform, which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor without advantage to the Public; together with the proceedings so essentially involving the interests of Inventors which have already taken place in Parliament, as to the propriety of abolishing Patent Rights altogether, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organising the influence of Inventors, Patentees, and others. Its objects are:—

- 1st. To protect Inventors' interests, and defend the privilege of obtaining Her Majesty's Letters-Patent.
- 2nd. To promote improvements in the Patent Laws.
- 3rd. To facilitate the diffusion of information with reference to Inventions, and other subjects beneficial to Inventors and Patentees.

The qualification for Annual Members of the Institute is a Yearly Subscription of One Guinea, and for Life Members a single payment of Ten Guineas.



NOTICE TO INTENDING PATENTEEES.

THE INVENTORS' PATENTRIGHT ASSOCIATION, LIMITED,

(The Proprietors of the "Scientific and Literary Review"),

21, COCKSPUR STREET, CHARING CROSS, LONDON, S.W.,

OBTAIN PATENTS FOR INVENTIONS AT FIXED AND MODERATE CHARGES

DIRECTORS.

P. W. LATHAM, Esq.
F. W. CAMPIN, Esq., Barrister-at-Law.
G. B. FINCH, Esq.

AUDITOR.

RICHARD COCKER, Esq.

BANKERS.

LONDON AND WESTMINSTER BANK, St. James's Square.

SCIENTIFIC REFEREES.

SIR CHARLES FOX, C.E., F.R.G.S., &c.
W. H. BARLOW, Esq., C.E., F.R.S., &c.
PROFESSOR WILLIAM POLE, C.E., F.R.S., &c.
JOHN WOODHOUSE, Esq. C.E., and M.E., &c.
ROBERT RICHARDSON, Esq., C.E., &c.

CAPTAIN J. H. SELWYN, R.N., &c.
HIRAM CRAVEN COULTHARD, Esq., C.E., &c.
BENJAMIN BURLEIGH, Esq., C.E.
DR. B. H. PAUL, F.C.S.

This Association was established in the year 1867. for the purpose of simplifying, cheapening, and expediting as far as possible the proceedings attending THE OBTAINING OF PATENTS FOR INVENTIONS and their commercial development.

Several leading members of the Inventors' Institute, coming daily in contact with Inventors, whose wants and difficulties were daily pressed on their attention, formed themselves into this Association, entitled "The Inventors' Patentright Association, Limited," in order to supply Inventors with the best and most reliable information and advice—to provide skilled references on questions of science and manufacture—to render legal processes for protecting and maintaining patent rights safe, cheap, and ready—and to aid Inventors in bringing their inventions into practicable and profitable shape. To carry out these views, the following are the

OBJECTS OF THE ASSOCIATION.

To obtain Patents for Inventions in this and other countries.
To Register Designs.
To form Public Companies, or otherwise arrange for the Public Introduction of Patented Inventions.

To Sell, and License Patented Inventions.
To furnish advice and professional Assistance in developing Inventions.
To collect Evidence, arrange Arbitrations, and otherwise assist Inventors in maintaining their rights.

N.B.—To Members of the Inventors' Institute this Association offers special privileges in the obtaining of Patents, both in this country and in all parts of the world.

A Handbook furnished gratis on application to

THOMAS MORGAN, Secretary, 21, Cockspur Street, Charing Cross, London.

London: Printed by H. W. FOSTER, 16, Bear Alley, Farringdon Street, E.C.; and Published for the Proprietors at 21, Cockspur Street, Charing Cross; and Sold by W. KENT & Co., 23, Paternoster Row, and SAMSON LOW, SON, & MASTON, English, American, and Colonial Booksellers and Publishers, Crown Buildings, 189, Fleet Street, London, E.C.

